

STATE OF GEORGIA
COASTAL NONPOINT POLLUTION
CONTROL PROGRAM

ENVIRONMENTAL ASSESSMENT

September 2001

U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Ocean Service

STATE OF GEORGIA

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CONTROL PROGRAM

ENVIRONMENTAL ASSESSMENT

Office of Ocean and Coastal Resource Management
Coastal Programs Division
1305 East-West Highway
Silver Spring, MD 20910

September 2001

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DESIGNATION: Environmental Assessment

TITLE: State of Georgia Coastal Nonpoint Pollution Control Program

ABSTRACT: This environmental assessment is prepared pursuant to the National Environmental Policy Act (NEPA), 42 U.S.C. 4321 et seq. to assess the environmental impacts associated with the approval and implementation of the Coastal Nonpoint Pollution Control Program (coastal nonpoint program) submitted to NOAA and EPA by the state of Georgia. Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA), 16 U.S.C. 1455b, requires states and territories with coastal zone management programs that have received approval under section 306 of the Coastal Zone Management Act to develop and implement coastal nonpoint programs.

For purposes of this environmental assessment, the proposed action is the conditional approval of the Georgia coastal nonpoint program. The Georgia coastal nonpoint program includes the implementation of management measures for forestry and marina source categories and for the protection of wetlands, riparian areas, and vegetated treatment systems, and many aspects of the agricultural, urban development, and hydromodification source categories. Georgia requested an exclusion for the forestry source category but NOAA and EPA find that the State has not provided sufficient justification for an exclusion.

NOAA and EPA find that the Georgia program meets many of the requirements of section 6217 and will approve the program with conditions. To receive final approval of its program, Georgia will need to meet the conditions, which include determining an appropriate 6217 management area boundary, developing a monitoring plan, and completing development of certain aspects of its programs addressing agricultural, urban, and hydromodification sources.

NOAA and EPA have determined that the conditional approval of the Georgia coastal nonpoint program will not result in any significant environmental impacts different from those analyzed in the Programmatic Environmental Impact Statement prepared for the 6217 program and will have an overall beneficial effect on the environment.

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GEORGIA
COASTAL NONPOINT POLLUTION CONTROL PROGRAM

TABLE OF CONTENTS

	<u>PAGE</u>
EXECUTIVE SUMMARY	1
1. OVERVIEW	3
1.A Background	3
1.B Purpose and Need for Action	3
2. ALTERNATIVES	5
2.A Approve Georgia Program	5
2.B Conditionally Approve Georgia Program	6
2.C Deny Approval of Georgia Program	10
3. AFFECTED ENVIRONMENT	13
3.A The Physical Environment	13
1. The 6217 Management Area	13
2. Coastal Environment	14
3.B Terrestrial Environment and Land and Water Uses	15
1. Population	15
2. Social and Economic Activities	16
4. ENVIRONMENTAL CONSEQUENCES	21
4.A Management Measures Implementation	21
1. Environmental Impacts	21
a. Agriculture	21
b. Urban Runoff	25
c. Forestry	33
d. Marinas	37
e. Hydromodification	41
f. Wetlands, Riparian Areas, Vegetated Treatment Systems ..	45
2. Socioeconomic Impacts	47
4.B Program Implementation	48
1. Environmental Impacts	48
a. Coordination with Existing State Programs	49
b. Coastal Zone Boundaries and 6217 Management Area	49
c. Implementation of Management Measures	50
d. Implementation of Additional Management Measures	51
e. Technical Assistance	51

f. Public Participation	51
g. Administrative Coordination	52 . . .
h. Monitoring	52
i. Enforceable Policies and Mechanisms	53
2. Socioeconomic Impacts	54
4.C Impacts of Alternatives	55
4.D Unavoidable Adverse Environmental Impacts	56
4.E Relationship Between Short-Term Uses of Environment and Enhancement of Long-Term Productivity	56
4.F Irreversible and Irretrievable Commitment of Resources	57
5. LIST OF PREPARERS	58
6. LIST OF AGENCIES AND PERSONS CONSULTED	58
7. FINDING OF NO SIGNIFICANT ENVIRONMENTAL IMPACT	59
8. REFERENCES	60
8. APPENDIX A. Management Measures for Sources of Nonpoint Pollution In Coastal Waters	

LIST OF TABLES

Table 1. Georgia's Major Barrier Islands	15
Table 2. Coastal County Population	16
Table 3. Agriculture in Coastal Counties	17

EXECUTIVE SUMMARY

The National Oceanic and Atmospheric Administration (NOAA) has prepared this environmental assessment to assess the environmental impacts associated with the approval and implementation of the coastal nonpoint pollution control program (coastal nonpoint program) submitted to NOAA and the Environmental Protection Agency (EPA) by the State of Georgia. Section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA), 16 U.S.C. section 1455b, requires states and territories with coastal zone management programs that have received approval under section 306 of the Coastal Zone Management Act (CZMA) to develop and implement coastal nonpoint programs. These programs were required to be submitted to NOAA and EPA in July 1995. Once approved, these programs will be implemented through changes to the state nonpoint source program approved by EPA under section 319 of the Clean Water Act and through changes to the state coastal zone management program approved by NOAA under the CZMA.

For purposes of this environmental assessment, the proposed action is the conditional approval of the Georgia coastal nonpoint program. The alternatives to the proposed action are to approve the program or to deny approval of the program.

The Georgia coastal nonpoint program includes the implementation of management measures for forestry and marina source categories and for the protection of wetlands, riparian areas, and vegetated treatment systems, and many aspects of the agricultural, urban development, and hydromodification source categories. Georgia requested an exclusion for the forestry source category but NOAA and EPA find that the State has not provided sufficient justification for an exclusion.

Georgia proposed using the existing coastal zone boundary as the boundary of its 6217 management area. NOAA and EPA find that Georgia's proposed 6217 management area excludes existing land and water uses that have or are reasonably expected to have a significant impact on the waters of the State.

NOAA and EPA find that the Georgia coastal nonpoint program meets many of the requirements of section 6217 and will be approved with conditions. To receive final approval of its program, Georgia will need to meet the conditions, which include determining an appropriate 6217 management area boundary, developing a monitoring plan, and completing development of certain aspects of its programs addressing agricultural, urban, and hydromodification sources.

NOAA and EPA have determined that the conditional approval of the Georgia coastal nonpoint program will not result in any significant environmental impacts different from those analyzed in the Programmatic Environmental Impact Statement prepared for the 6217 program and that this alternative will have an overall beneficial effect on the environment.

1. OVERVIEW

1.A Background

In 1990, Congress enacted section 6217 of the Coastal Zone Act Reauthorization Amendments (CZARA), entitled "Protecting Coastal Waters", to help address the problem of nonpoint source pollution and its effect on coastal waters. The purpose of the section is to strengthen the links between Federal and state coastal zone management and water quality programs in order to enhance state and local efforts to manage land use activities that degrade coastal waters and habitats. Section 6217 requires states and territories with federally approved coastal management programs to develop coastal nonpoint pollution control programs (coastal nonpoint programs) and submit them to the National Oceanic and Atmospheric Administration (NOAA) and the Environmental Protection Agency (EPA) in July 1995 for approval. Once approved, these programs will be implemented through changes to the state nonpoint pollution program approved by EPA under section 319 of the Clean Water Act (CWA) and through changes to the state or territorial coastal zone management program approved by NOAA under the CZMA.

Section 6217 utilizes a two-tiered management approach for the control of nonpoint sources of pollution. The purpose of the first tier is to protect coastal waters generally. It requires that states and territories implement, at a minimum, management measures in conformity with guidance (known as the 6217 (g) guidance, or management measures guidance) that was developed by EPA in consultation with NOAA and other Federal agencies. The management measures developed by EPA address the nonpoint pollution source categories of agricultural runoff, urban runoff, forestry runoff, hydromodification, and marinas. Management measures must also be implemented for wetlands protection, riparian areas, and vegetated filter strips. Once the first tier of management measures are implemented to protect coastal waters generally, the state or territory will need to develop additional management measures to apply, as necessary, to meet water quality standards and protect designated uses.

1.B Purpose and Need for Action

In March 1996, NOAA published a programmatic environmental impact statement (PEIS) that assessed the environmental impacts associated with the approval of state and territory coastal nonpoint programs (NOAA, 1996). The PEIS forms the basis for the environmental documents NOAA is preparing on each state and territorial coastal nonpoint program submitted for approval. In the PEIS, NOAA determined that the approval and conditional approval of coastal nonpoint programs will not result in any significant adverse environmental impacts and that these actions will have an overall beneficial effect on the environment. The analyses presented in the PEIS are incorporated by reference into this environmental assessment (EA).

NOAA has prepared this EA to assess the environmental impacts associated with the approval and implementation of the coastal nonpoint program submitted to NOAA and EPA by the State of Georgia on December 1, 1999. The Georgia program will be approved after a joint NOAA/EPA review if it meets all of the requirements of section 6217 as specified in the statute and in the guidance documents for the program. The analysis in this EA also serves to determine

whether the impacts associated with program approval are significantly different from those analyzed in the PEIS, so as to require the preparation of an environmental impact statement (EIS).

In December 1997, NOAA prepared a final environmental impact statement (FEIS) on the Georgia coastal management program submitted for approval under the CZMA (NOAA/Georgia, 1997). The Georgia coastal management program establishes the boundaries of the coastal area within which the program applies; describes the organizational structure to implement the program; and provides a set of statewide policies applicable to all state and Federal agencies which manage resources along the state's coastline. The information in the FEIS is relevant to this analysis because the section 6217 coastal nonpoint program is to be implemented through the Georgia coastal zone management program, as well as its section 319 Clean Water Act program. Therefore, the Georgia FEIS is incorporated by reference into this EA.

2. ALTERNATIVES

For purposes of this environmental assessment, the proposed action is the conditional approval of the Georgia coastal nonpoint program. The alternatives to the proposed action are to approve the program without conditions or to deny approval of the program. The proposed action, its alternatives, and a summary of their environmental consequences are described below.

2.A Approval of the Georgia Coastal Nonpoint Program

To assist states and territories in the development of their coastal nonpoint programs, NOAA and EPA jointly published a guidance document, Program Development and Approval Guidance (NOAA/EPA, 1993). The state and territory programs will be approved after a joint NOAA/EPA review if they meet all of the requirements of section 6217 as specified in the statute and in the program guidance documents. Specifically, the Georgia program must contain the following components:

- o Coordination with Existing State Programs
- o Determination of the 6217 Management Area
- o Implementation of Management Measures in Conformity with (g) Guidance
- o Identification and Implementation of Additional Management Measures
- o Technical Assistance
- o Public Participation
- o Administrative Coordination
- o Identification of Enforceable Policies and Mechanisms

The alternative of approving the Georgia coastal nonpoint program would generally be expected to have a beneficial effect on the environment because the program would help to control sources of nonpoint pollution and would result in fewer pollutants reaching the state's coastal waters. For example, the nonpoint program will help to control the level of coliform bacteria that is responsible for a section of Brushy Fork Creek (Lake Charlton to Big Haynes Creek) only partially supporting its designated use. The nonpoint program will also help to control urban runoff that has been responsible for elevated fecal coliform levels in Savannah Harbor and low dissolved oxygen levels and a ban on shellfishing in portions of St. Simons Sound (Georgia DNR, 1997).

The nonpoint program will also make existing programs more effective by strengthening the link between Federal and Georgia state coastal zone management and water quality programs. In their review of the Georgia program, NOAA and EPA have found that the program does not meet all of the requirements of section 6217. Therefore, full approval of the Georgia coastal nonpoint program is not a feasible alternative. The rationale for this decision is discussed below under the conditional approval alternative. However, as discussed below, the conditional approval alternative is expected to result in the same environmental benefits as the approval alternative, provided Georgia satisfies the conditions.

2.B Conditional Approval of the Georgia Coastal Nonpoint Program

[Preferred Alternative]

While NOAA and EPA expect the coastal nonpoint programs submitted for approval to meet all of the requirements of section 6217, NOAA and EPA realize that in some situations, a program may require changes before final approval can be granted. In these situations, NOAA and EPA will grant conditional approval in order to provide states and territories an opportunity to make necessary changes. Conditional approvals are intended primarily to provide additional time to:

- (1) address identified gaps, including obtaining new statutory or regulatory authority, if necessary;
- (2) demonstrate that existing authorities are adequate for ensuring implementation of the management measures; and,
- (3) develop other incomplete program components.

NOAA and EPA will provide up to five years from the time of conditional approval for completion of a coastal nonpoint program. The length of the conditional approval will depend on which program components are subject to conditions and how long it will take to finalize those components.

NOAA and EPA find that the Georgia coastal nonpoint program meets many of the section 6217 requirements and adequately addresses all program components with the exception of the following components. The state will be able to receive final approval of these components, and therefore final approval of its program, by meeting the conditions described below for each component.

(1) Boundary

Georgia's proposed 6217 management area excludes existing land and water uses that have or are reasonably expected to have a significant impact on the coastal waters of the State.

In order to receive final approval, the program must meet the following condition:

! Within one year, the Georgia Department of Natural Resources, U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration and other relevant State, local, and Federal agencies will participate in a cooperative process to determine an appropriate 6217 management area boundary to protect the State's coastal waters from nonpoint source pollution.

(2) Agricultural Runoff

Georgia's program includes management measures in conformity with the 6217(g) guidance, except it does not include Facility Wastewater and Runoff from Confined Animal Facilities Management Measures (Large and Small Units), or Nutrient Management Measures. The State should provide a legal opinion that clearly states that the backup authorities can be used to prevent nonpoint pollution and require management measure implementation. The State should strengthen its description of the voluntary or incentive based programs to implement the

management measures, the description of the mechanism or process linking the implementing agency with the enforcement agency and its commitment to use the enforcement authority where necessary.

In order to receive final approval, the program must meet the following conditions:

! Within two years, Georgia will include in its program management measures for Facility Wastewater and Runoff from Confined Animal Facilities Management Measures (Large and Small Units) and Nutrient Management Measures in conformity with the 6217(g) guidance. Georgia will also include a legal opinion that clearly states that the backup authorities can be used to prevent nonpoint pollution and require management measure implementation.

(3) Forestry

Georgia has not provided sufficient justification to support a categorical exclusion of forestry from its coastal nonpoint program. Georgia's program includes management measures in conformity with the 6217(g) guidance.

In order to receive final approval, the program must meet the following condition:

! Within two years, Georgia will include a legal opinion that clearly states that the backup authorities can be used to prevent nonpoint pollution and require management measure implementation.

(4) Urban Runoff - New Development

The Georgia program does not include management measures in conformity with the 6217(g) guidance. The state does not include management measures to reduce total suspended solids (TSS) by 80% after the construction site is permanently stabilized, or to maintain post-development peak runoff rates to be at pre-development levels in conformity with the 6217 guidance. Georgia has provided a legal opinion demonstrating that the State has authority to prevent nonpoint pollution and require implementation of management measures for activities exempted by the Erosion and Sedimentation Act, but has not adequately described the voluntary or incentive based programs or described the process linking the implementing agency with the enforcement agency and its commitment to use the enforcement authority where necessary.

In order to receive final approval, the program must meet the following conditions:

! Within two years, Georgia will include in its program management measures in conformity with the 6217(g) guidance. Within one year Georgia will develop a strategy (in accordance with the 5 Year Implementation Strategy) to implement the management measure throughout the 6217 management area. For activities exempted by the Erosion and Sedimentation Act, the state needs to strengthen its description of the voluntary or incentive based programs to implement the new development management measure, the description of the mechanism or process linking the implementing agency with the enforcement agency and its commitment to use the enforcement authority where necessary.

(5) Urban Runoff - Watershed Protection and Existing Development

The Georgia program includes management measures for Watershed Protection, but does not include management measures for Existing Development in conformity with the 6217(g) guidance. The program includes enforceable policies and mechanisms to ensure implementation in portions of the 6217 management area, but not throughout the entire area.

In order to receive final approval, the program must meet the following conditions:

! Within two years, Georgia will include management measures in conformity with the 6217 (g) guidance and within one year will include in its five-year program implementation strategy a plan to implement the management measures throughout the 6217 management area.

(6) Urban Runoff - Construction Site Erosion and Sediment Control

The policy of NOAA and EPA is to defer to NPDES Phase II permitting program for the Construction Site Erosion and Sediment Control management measure.

(7) Urban Runoff - Construction Site Chemical Control

The Georgia program does not include management measures in conformity with the 6217(g) guidance. Georgia has provided a legal opinion that the State has authority to prevent nonpoint pollution and require implementation of management measures. The State needs to provide a description of the voluntary or incentive based programs to implement this management measure, the description of the mechanism or process linking the implementing agency with the enforcement agency and its commitment to use the enforcement authority where necessary.

In order to receive final approval, the program must meet the following conditions:

! Within two years, Georgia will include in its program management measures in conformity with the 6217(g) guidance. Within one year, Georgia will develop a strategy (as part of the 5-Year Implementation Strategy) to implement the management measure throughout the 6217 management area.

(8) Urban Runoff - New Onsite Disposal Systems and Operating Onsite Disposal Systems (OSDS)

Georgia's program includes management measures in conformity with the 6217(g) guidance except it does not include measures for (1) inspecting Onsite Disposal Systems (OSDS) at a frequency adequate to ascertain whether OSDS are failing or (2) replacing or upgrading OSDS near nitrogen-limited surface waters. The State's program includes enforceable policies and mechanisms to ensure implementation throughout the management area.

In order to receive final approval, the program must meet the following conditions:

! Within three years Georgia will include in its program management measures for inspection and maintenance of existing OSDS and protection of nitrogen-limited surface waters in conformity with the 6217(g) guidance.

(9) Roads, Highways, and Bridges

The Georgia program does not include management measures in conformity with the 6217(g) guidance. Georgia has provided a legal opinion that the State has authority to prevent nonpoint pollution and require implementation of management measures. The State needs to strengthen its description of the voluntary or incentive based programs to implement roads, highways, and bridges management measures, particularly for local and county projects, and the description of the mechanism or process linking the implementing agency with the enforcement agency and its commitment to use the enforcement authority where necessary.

In order to receive final approval, the program must meet the following conditions:

! Within two years, Georgia will include in its program management measures in conformity with the 6217(g) guidance. Within one year Georgia will develop a strategy to implement the management measures throughout the 6217 management area.

(10) Hydromodification - Physical and Chemical Characteristics of Surface Waters and Instream and Riparian Habitat Restoration

The Georgia program includes management measures in conformity with the 6217 (g) guidance, except the program does not include development of an operation and maintenance plan for existing modified channels to improve physical and chemical characteristics of surface waters and identify opportunities to restore habitat in those channels. The program includes enforceable policies and mechanisms that ensure implementation of the measures throughout the 6217 management area, except for activities exempted by the Coastal Marshlands Protection Act. In order to receive final approval, the program must meet the following conditions:

! Within two years, Georgia will include in its program measures that are in conformity with the 6217 (g) guidance for hydromodification. Within one year, Georgia will develop a strategy to implement the management measures throughout the 6217 management area.

(11) Hydromodification -Dams

Georgia's program includes management measures in conformity with the 6217(g) guidance, except it does not include management measures to apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters or management measures for protection of surface water quality and instream and riparian habitat.

In order to receive final approval, the program must meet the following condition:

! Within two years, Georgia will include in its program measures that are in conformity with the 6217 (g) guidance.

(12) Hydromodification - Streambank and Shoreline Erosion

Georgia's program does not include management measures in conformity with the 6217(g) guidance.

In order to receive final approval, the program must meet the following conditions:

! Within two years, Georgia will include in its program measures that are in conformity with the 6217 (g) guidance. Within one year, Georgia will develop a strategy to implement the management measures throughout the 6217 management area.

(13) Monitoring

Georgia's program does not include a plan to assess over time the success of the management measures in reducing pollution loads and improving water quality.

To receive final approval, the program must meet the following condition:

! Within one year, Georgia will develop a plan that enables the State to assess over time the extent to which implementation of management measures is reducing pollution loads and improving water quality.

The alternative of conditionally approving the Georgia coastal nonpoint program is expected to have the same beneficial results as would full approval and will avoid the adverse impacts associated with denial of approval, provided Georgia satisfies the conditions. The immediate implementation of the completed portions of the program will begin to fulfill the intent of section 6217 by helping to control sources of nonpoint pollution thus resulting in a reduction of pollution reaching coastal waters. Positive socioeconomic benefits will accrue as improvements in coastal water quality resulting from controlling nonpoint pollution increase the aesthetic value of coastal areas thereby benefitting tourism and providing enhanced opportunities for boating and swimming and other water related activities. Improvements in water quality are also likely to improve shellfish harvesting and fisheries. There may be some slight and localized socioeconomic impacts from implementation of management measures and because of restrictions that may result from designation of critical coastal areas.

2.C Deny Approval of the Georgia Coastal Nonpoint Program [No Action]

The decision to deny approval of a coastal nonpoint program has the same effect as the "no action" alternative under the National Environmental Policy Act. Although section 6217 requires states to develop and implement coastal nonpoint programs, approval of the programs is not assured until NOAA and EPA find that all the requirements of section 6217 have been met. Denial of approval of a program will have the effect of relying on existing nonpoint control efforts and levying financial penalties on both the state's coastal zone management program under the CZMA and the state's nonpoint pollution program under section 319 of the Clean Water Act. The schedules for such penalties are stipulated in section 6217(c) of the CZARA. The denial of program approval and the imposition of financial penalties may have an adverse environmental effect because it may cause Georgia not to implement management measures that are meant to control coastal nonpoint pollution, restore degraded waters, and protect critical coastal areas.

There are many specific examples of how nonpoint pollution has caused water quality problems in the coastal waters of Georgia. Water quality problems caused by nonpoint pollution have caused a ban on shellfishing in sections of the Altamaha, Cumberland, and Ossabaw estuaries and in portions of the Medway River in Sunbury. Low dissolved oxygen and fecal coliform

bacteria cause the waters in the St. Mary's River (Spanish Creek to St. Mary's Cut) to only partially support designated uses (Georgia DNR, 1997).

NOAA and EPA have reviewed the Georgia coastal nonpoint program and found that the program meets many of the requirements of section 6217. Therefore, denying approval of the program is not the preferred alternative.

3. AFFECTED ENVIRONMENT

As required by section 6217(a) of the CZARA, the geographic scope of each coastal nonpoint program must be sufficient to ensure implementation of management measures to "restore and protect coastal waters." Pursuant to section 6217(e), NOAA, in consultation with EPA, made recommendations to each state and territory on the geographic scope of its program (also known as the "6217 management area") (NOAA, 1992). This recommendation was based on the extent of coastal watersheds in each state and territory. States or territories were not required to adopt NOAA's exact boundary recommendation; they could propose an alternative 6217 management area at the time of program submission.

Georgia's proposed 6217 management area consists of the State's existing coastal zone boundary. The area includes all coastal Georgia counties plus those counties immediately inland (west) and adjacent to the coastal counties. The State's proposal represents a reduction of the NOAA recommended 6217 management area.

Because the actual geographic scope of each coastal nonpoint program was unknown during the preparation of the PEIS, that document used NOAA's original recommendation - coastal watersheds - for purposes of generally describing the environment to be affected. The description of the environment in the PEIS was of a general nature because of the widely diverse areas encountered across all of the twenty-nine states and territories that were expected to submit coastal nonpoint programs. The following is a more specific description of the environment in the Georgia 6217 management area, based on the PEIS, the EIS prepared by NOAA during approval of Georgia's coastal zone management program, and the Georgia coastal nonpoint program submission.

3.A The Physical Environment

1. The Georgia 6217 Management Area

As stated above, NOAA selected coastal watersheds as its basic recommendation for all state and territory 6217 management areas. After evaluating all coastal watersheds in Georgia for significant indicators of pollution potential, NOAA and EPA recommended to Georgia that a 6217 management area which included all drainage basins adjacent to the coast is necessary "to control sources of pollution that, individually or cumulatively, significantly impact the state's coastal waters". Georgia proposed utilizing the existing coastal zone boundary to define the 6217 management area. NOAA and EPA find that Georgia's proposed boundary excludes existing land and water uses that have or reasonably are expected to have a significant impact on coastal waters. Based on a review and analysis of water quality information in the state, several existing sources of nonpoint pollution emanating from areas just outside the proposed management area have been identified. These include animal waste runoff from Bulloch, Appling, and Tattnall Counties, and 23 impaired waterbodies from the 303(d) listed waters in adjacent inland counties. Georgia's 1990-1991 305(b) water quality report (Georgia DNR, 1991) identifies several locations where pathogens attributed to marinas operations were responsible for shellfish area closures in the Wassaw, St. Catherine's, Sapelo, and Doboy estuaries.

NOAA and EPA have not accepted the boundary as proposed by Georgia and have made final approval of the 6217 management area boundary subject to the following condition: Within one year, the Georgia Department of Natural Resources, U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration and other relevant State, local, and Federal agencies will participate in a cooperative process to determine an appropriate 6217 management area boundary to protect the State's coastal waters from nonpoint source pollution.

2. Coastal Environment

The Georgia coast is an interrelated system of productive coastal marine waters, barrier islands, estuaries, coastal marshlands, rivers and associated upland areas (NOAA/Georgia DNR, 1997). The coastline extends for about 100 miles from the north end of Tybee Island to the southern tip of Cumberland Island. The tidal creeks and rivers that meander through the coastal marshes create more than 2300 linear miles of shoreline.

Barrier islands are narrow strips of land composed of unconsolidated material extending parallel to the coast and separated from the mainland by a relatively narrow body of fresh, brackish or saltwater, or a wetland. Barrier islands such as Cumberland Island and St. Simons act as buffers to storm surges and restrict salt water intrusion into estuarine areas. The 13 major barrier islands along the Georgia coast have about 88 miles of sand beaches (Table 1). Tybee Island, St. Simons Island, Sea Island, and Jekyll Island are the only islands accessible to the mainland by causeway. The beaches on the nine other islands exist in an essentially natural state, free of artificial impacts to their natural dynamic sand dune fields (The Georgia Sound, 1998). Loggerhead, green, and leatherback sea turtles use the beaches for nesting.

The Georgia coastal region is located in the Carolinian biogeographic province. This province, which extends from Cape Hatteras to Cape Kennedy, Florida, is characterized by extensive marshes and well-developed barrier islands. The biota is temperate but has seasonal tropical representatives (U.S. Fish and Wildlife Service, 1979). The tides are semidiurnal and average about 7 feet.

NOAA's National Estuarine Inventory (NOAA, 1990a) classifies Georgia as being part of the South Atlantic Estuarine Drainage Area (EDA). The South Atlantic EDA extends from North Carolina to southern Florida. The Georgia estuaries in this EDA include: Savannah River, Ossabaw Sound, St. Catherines/Sapelo Sounds, Altamaha River, St. Andrew/St. Simons Sounds, and St. Mary's River/Cumberland Sound. Estuaries in Georgia are characterized by a low-lying marshy shoreline with a dendritic pattern of tributaries flowing to the sea.

Estuaries and adjacent marshes provide habitat for migrating and nesting waterfowl and shorebirds. Estuarine systems exhibit high biological productivity and diversity. Estuaries contribute directly to the productivity of the state commercial and recreational fisheries. Georgia's estuaries support important commercial and recreational species such as menhaden, croaker, spotted seatrout, snapper, grouper, red drum, killifish, anchovies, blue crabs, clams, oysters, and shrimp. Estuaries and their associated wetlands provide important habitat in the life cycle of shrimp and menhaden, the two most important commercial fishery resources in the region. Young shrimp and menhaden, for example, migrate from offshore areas to grow and mature in the shallow estuaries.

Table 1. GEORGIA'S MAJOR BARRIER ISLANDS					
ISLAND	ACREAGE	MILES OF BEACH	ISLAND	ACREAGE	MILES OF BEACH
Tybee	1,500	3.4	Sapelo	10,900	5.6
Little Cumberland	1,600	2.4	Little St Simons	2,300	6.5
Wassaw	2,500	6.0	Sea	1,200	3.8
Ossabaw	11,800	9.0	St. Simons	12,300	3.8
St. Catherine	7,200	11.0	Jekyll	4,400	8.0
Blackbeard	3,900	7.5	Cumberland	15,100	16.9
Little Tybee	1,600	3.0			

Source: NOAA/Georgia DNR, 1997

Georgia contains approximately 384,000 acres of salt marsh wetlands and 1,116,000 acres of freshwater wetlands. The salt marshes extend an average of 4 to 6 miles inland. Georgia lost an estimated 7,300 acres of wetlands a year between 1950 and 1970 (NOAA/Georgia DNR, 1997). Brackish and freshwater marshes and bottomland hardwood swamps extend inland up the many rivers and streams. The swamps provide critical habitat for endangered and threatened species such as the bald eagle and wood stork. Most of these rivers provide critical habitat for the endangered shortnose sturgeon.

3.B Terrestrial Environment and Land and Water Uses

This section provides a description of the terrestrial environment and the land and water users and uses in the Georgia 6217 management area. The Georgia coastal zone supports extensive and varied commercial and recreational activities. The intensity and nature of land and water uses in many areas has threatened and degraded coastal water quality.

1. Population

The eleven-county coastal area of Georgia had a 1999 population of 538,469 people; this is an increase of 34,721 since 1994 (Table 2). Most of the population is located in the Savannah area (Chatham, Effingham, and Bryan Counties), with smaller centers around Brunswick (Glynn County) and Kingsland/St. Mary's (Camden County). In 1988, Georgia had a coastal population of 158 people per shoreline mile; this is projected to increase to 179 people per shoreline mile by the year 2010 (NOAA, 1990b). The coastal population continues to grow as a result of tourism on Tybee Island, Sea Island, St. Simons Island, and Jekyll Island, as well as from military bases in Camden, Long, and Liberty Counties. The population of Liberty County alone is expected to increase by 42 percent by the year 2010 (NOAA, 1990b).

Table 2. Coastal Counties Population			
County	Population	% Change 1990-2000	Persons/square mile
Chatham	232,048	7.0%	529.8
Glynn	67,568	8.1%	160.1
Liberty	61,610	16.8%	118.7
Camden	43,664	44.7%	69.3
Effingham	37,535	46.1%	78.4
Wayne	26,565	18.8%	41.2
Bryan	23,417	51.7%	53.0
Brantley	14,629	32.1%	32.9
McIntosh	10,847	25.6%	25.1
Long	10,304	66.1%	25.7
Charlton	10,282	21.0%	13.2

Source: U.S. Census Bureau, 2000

2. Social and Economic Activities

The type and extent of land and water uses in the 6217 management area is an indication of the pollutants entering Georgia's coastal waters and the extent to which the environment of the surrounding watersheds have been altered. The development of urban, agricultural, and forested lands and the activities associated with them alter the landscape and generate many of the pollutants entering coastal waters.

a. Agriculture

The extensive coastal marshes, flood plains, and swamps in coastal Georgia limit the amount of land that is capable of supporting agriculture. In spite of this lack of suitable high ground with well-drained soils, agriculture is of immense economic and social importance.

Approximately 7.3 percent of the coastal area is in agricultural use. Row crop agriculture is an important economic activity, especially in the second tier of coastal counties (Effingham, Long, Wayne, Brantley, and Charlton Counties). Tobacco is the most important row crop grown, followed by corn, soybeans, peanuts, and cotton. There were 1,077 individual farms in the 11 coastal counties in 1997 (Table 3). Wayne County contained the most farms (276), followed by Brantley and Effingham with 207 and 203, respectively (NASS, 1999). Approximately 19,000 cattle, 17,800 hogs and pigs, and several million chickens are raised in the coastal area (NOAA/Georgia DNR, 1997).

Table 3. Agriculture in Coastal Counties			
County	Number of Farms	Land in Farms (acres)	Value of Crops (\$1000)
Wayne	276	65,209	17,036
Brantley	207	27,780	13,445
Effingham	203	52,479	8,220
Charlton	75	20,362	2,939
Long	64	18,875	6,064
Bryan	61	25,477	1,782
Camden	46	18,963	653
Liberty	43	20,989	913
Chatham	42	8,694	2,935
Glynn	36	7,742	375
McIntosh	24	4,205	159

Source: NASS, 1999.

b. Forestry

The United States contains six major "natural forest regions" that are primarily defined by their uniqueness in their mix of species, climate, and physiography. Georgia forests are part of the South Forest region. The South region contains many diverse forest types; one-third of the area is comprised of various species of pine, with loblolly pine being the most abundant species. The major hardwood types are ash, black gum, hickory, maple, red oak, white oak, sweetgum, tupelo, and yellow poplar. The major softwood types are cypress, loblolly pine, longleaf pine, red pine, shortleaf pine, slash pine, and white pine. Forested lands provide important environmental benefits such as soil conservation, clean air and water, and wildlife habitat, as well as recreational opportunities.

Much of the coastal mainland is heavily forested with slash, loblolly and longleaf pines. Forests that are less managed are populated with a mixture of pines and other species such as oak, hickory, magnolia, bay, palmetto and dogwood. Extensive forested lands are found in the area of St. Andrew/St. Simons Sounds.

Commercial forests cover over 2.5 million acres or 71 percent of the land area in coastal Georgia. The moderate coastal climate, long growing season, an average of 30 to 50 inches of rainfall per year, and fertile soils make the coastal area an important area for timber growth and processing. Almost half of the timberland is owned by industry, 39 percent is privately-owned, and 13 percent is owned by the government. There are 6 paper mills in the coastal counties.

Forest products produced include timber, sawtimber, pulpwood, pine straw, and naval stores (turpentine, tar, and pitch). The total income from forestry activities, including sawtimber and pulpwood, was \$110.5 million in 1993 (NOAA/Georgia DNR, 1997).

c. Urban

As previously mentioned, the eleven-county coastal area of Georgia had a 1999 population of 538,469 people; an increase of 34,721 since 1994. Although most of the population is located in the area of Savannah, Brunswick and Kingsland/St. Mary's, coastal Georgia is almost 67 percent rural and much of the coast remains largely undeveloped. As of the mid-1980's, only 4 percent of the coast was considered developed. Of that, only 3.3 percent was classified as residential, 0.3 percent as commercial, and 0.4 percent as industrial (NOAA/ Georgia DNR, 1997). The Savannah metropolitan area is losing population as people move to the suburbs in Effingham and Bryan Counties.

In addition to population data, development activity is also indicative of growth in coastal areas. According to the NOAA report *Building Along America's Coasts, 20 Years of Building Permits, 1970-1989* (NOAA, 1992), during this twenty year period, Georgia issued building permits for 56,839 residential units and 3,974 non-residential units in coastal counties. Chatham and Glynn counties were the leading counties with 32,014 and 10,877 residential and 2,418 and 981 non-residential permits issued, respectively.

d. Marinas

Recreational boating activities are a major use of Georgia's coastal waters. With 316,770 boats registered in the state in 1999, Georgia ranks fourteenth in the country. This is an increase of over 7,000 boat registrations since 1997 (NMMA, 1999). Forty-five marinas and 38 public boat ramps serve the approximately 25,000 boats that are registered in the 6 coastal counties of Camden, Glynn, McIntosh, Liberty, Bryan and Chatham (NOAA/Georgia DNR, 1997). There also are 34 non-boating facilities such as piers and docks available for public use.

e. Fisheries

The economic viability of Georgia's commercial and recreational fisheries is dependent on the quality of its wetlands and coastal waters. The harvest of commercial fish has dropped dramatically for some species in the last 10 years. For example, the shad catch has dropped 78 percent and the sturgeon catch has declined 98 percent (Coast Alliance, 1995).

Approximately 2,400 persons purchased commercial fishing licenses in 1995 (NOAA/Georgia DNR, 1997). In 1990 there were 738 vessels in Georgia's commercial fishing fleet (COPR, 1992). The shrimp trawl fishery - with 537 commercial trawler licenses issued - is the principal commercial fishing industry. In 1995, approximately 7 million pounds of shrimp valued at \$27 million were harvested. The second largest commercial fishery is for blue crabs. In 1995, approximately 7 million pounds of blue crabs valued at \$5 million were harvested. The most recent data from the National Marine Fisheries Service states that a total of 12,249,518 pounds of fish with a value of \$22,958,316 were landed in Georgia in 1999 (NOAA, 2001). The port of Darien-Bellville ranked 86th in the nation in volume of fish landed with 4.9 million pounds landed. The fishing industry also included 8 fish processing plants and 58 fish wholesale plants in

1998 (NMFS, 1999).

In 1998, 210,480 marine recreational anglers took 763,932 saltwater fishing trips and landed nearly 100 different species of marine fish (Marine Recreational Fisheries Statistics Survey, 1998). Bluefish, sharks, seatrout, snappers, seabass, drum, flounder, Spanish mackerel, red drum, and porgies are popular recreational marine fish.

According to the National Marine Fisheries Service (NOAA, 2001), the harvesting of oysters and clams in Georgia showed wide fluctuations in the years between 1995 and 1999. Although only 4,269 pounds of eastern oysters were harvested in 1996, the harvest increased to 7,480 pounds in 1997, and then decreased to 6,608 pounds in 1999. The total of 9,763 pounds of hard clams harvested in 1995 increased to a high of 31,647 pounds in 1996 and decreased to 24,912 pounds in 1999. St. Helena Sound and St. Catherines/Sapelo Sounds are major sources of clams and oysters. Scallops and mussels are not commercially harvested in Georgia.

In 1998, there were 73 aquaculture farms with sales of almost \$3 million producing food fish, baitfish, ornamental fish, sport or game fish, crustaceans, mollusks, algae, sea vegetables, and aquatic plants (Census of Aquaculture, 1998).

f. Recreation and Tourism

Recreation and tourism are important components of the coastal economy. The total tourist expenditure in the coastal area in 1993 was \$1.39 billion (NOAA/Georgia DNR, 1997). Most tourism is generated by the beaches and historical sites. The Savannah area attracted 5.4 million visitors in 1993 while Glynn County attracted 1.53 million visitors in 1995. The beaches on Tybee Island, St. Simons Island, Sea Island, and Jekyll Island - which are accessible to the mainland by causeway - are popular tourist attractions. Georgia's mild climate allows outdoor activities such as golf, tennis, boating and sport fishing to be enjoyed all year. Federal parks and four State Parks and four historic sites such as the National Historic Landmark districts in Savannah and Jekyll Island, Cumberland Island National Seashore, Fort Frederica National Historical Monument and are major attractions for visitors.

4. ENVIRONMENTAL CONSEQUENCES

Management measures are defined in section 6217 as economically achievable measures to control the addition of pollution to coastal waters, which reflect the greatest degree of pollutant reduction achievable through the application of the best available nonpoint pollution control practices, technologies, processes, siting criteria, operating methods, or other alternatives. As required by the statute, EPA developed guidance (USEPA, 1993) specifying management measures for the following nonpoint pollution source categories: agricultural runoff, urban runoff, forestry runoff, marinas, hydromodification, and wetlands, riparian areas, and vegetated treatment systems. Coastal nonpoint programs must provide for the implementation of management measures that are in conformity with this guidance. The guidance also lists and describes management practices that EPA has found to be representative of the types of practices that can be applied successfully to achieve the management measures. State and territory programs are not required to specify practices, but must include a process for selection of practices that will achieve the measures.

NOAA's PEIS discussed the fifty-six management measures and their function in preventing environmental degradation caused by the pollutants associated with each nonpoint source category. Each coastal nonpoint program must address each of the management measures by either: (1) providing for the implementation of that measure or an alternative as effective, or (2) justifying why the management measure is not included in the program. States and territories may exclude nonpoint source categories or subcategories where the sources do not exist or do not, individually or cumulatively, present significant impacts to coastal waters.

4.A MANAGEMENT MEASURES IMPLEMENTATION

1. ENVIRONMENTAL IMPACTS

The Georgia coastal nonpoint program provides for the implementation of management measures for many aspects of the urban development, marinas, and hydromodification nonpoint source categories, and for the protection of wetlands, riparian areas, and vegetated treatment systems. In some cases, NOAA and EPA have attached conditions to ensure that the state's program will conform to the guidance documents published by EPA and NOAA. Georgia requested an exclusion for the forestry source category. NOAA and EPA do not find that there is sufficient justification for an exclusion. The full text of all management measures and a statement of their applicability can be found in Appendix A.

a. Agricultural Nonpoint Pollution Source Category

Although the amount of land suitable for intensive agriculture in coastal Georgia is limited, agriculture is of critical importance to the State's economy and is a source of nonpoint pollution to coastal waters. Row crop agriculture is an important economic activity, especially in the second tier of coastal counties (Effingham, Long, Wayne, Brantley, and Charlton Counties). The major agricultural commodities produced in coastal Georgia are tobacco, corn, soybeans, cotton, peanuts, cattle, hogs and chickens.

Since all of the cropland in Georgia is in the coastal zone or watersheds that drain to the coast, agricultural runoff is a major source of coastal water pollution. Agricultural runoff is a factor contributing to harvest limitations in shellfishing waters in Georgia. According to the *National Shellfish Register of Classified Growing Waters* (NOAA, 1997), agricultural runoff was a contributing factor to water quality degradation that caused a prohibition on harvesting of shellfish in 1,124 acres of classified shellfish waters in Upper South Newport River in St. Catherine's/Sapelo Sounds. Agricultural runoff was also a contributing factor to restrictions on shellfishing in 19,005 acres of waters in the Brunswick River in St. Andrew/St. Simons Sounds.

According to the Georgia Nonpoint Source Management Program (Georgia DNR, 1999), a portion of the Reedy and Coleman Creeks watersheds in the Satilla Basin (Wayne County) have the potential for water quality problems and were projected as priority watersheds for remedial water quality actions because of agricultural activities.

Management measures for the following six subcategories of sources of agricultural nonpoint pollution that affect Georgia's coastal waters will be implemented as part of the State's coastal nonpoint program:

- o Erosion and sediment control
- o Confined animal facilities
- o The application of nutrients
- o The application of pesticides
- o Grazing management
- o Irrigation water management

The Environmental Consequences section of the PEIS contains a description of the primary pollutants in agricultural runoff and an analysis of the impacts of these pollutants on water quality. The management measures are designed to prevent the environmental degradation caused by these pollutants.

The implementation of agricultural management measures will reduce the generation of nonpoint source pollutants from agricultural activities and minimize the delivery of pollutants from agricultural lands to surface and ground waters. Agricultural management measures emphasize the control and removal of the sediment, nutrients, and pesticides entrained in runoff before they enter coastal waters. The management measures for confined animal facilities are intended to eliminate the pollutants leaving a facility by storing runoff and reducing the amount of facility wastewater and manure reaching a waterbody. The nutrient and pesticide management measures will promote a more efficient use of fertilizers and pesticides by limiting the amount of nitrogen, phosphorus, and chemicals applied to agricultural lands thereby reducing their runoff and leaching into surface and ground waters. Management measures for grazing and irrigation will protect sensitive areas such as streambanks and wetlands from damage by grazing of domestic livestock and promote the more efficient use of irrigation water. This will improve aquatic habitat and reduce the total pollutant discharge from irrigation systems.

The implementation of agricultural management measures in conformity with the 6217(g) guidance throughout the 6217 management area based on the existing state programs listed below will result in a more consistent, widespread implementation of Georgia's programs with the

resulting environmental benefits associated with a reduction in agricultural nonpoint pollution. Additional benefits will be attained by fulfillment of the conditions to include in its program management measures for Facility Wastewater and Runoff from Confined Animal Facilities Management Measures (Large and Small Units) and Nutrient Management Measures in conformity with the 6217(g) guidance.

Management Measures for Agricultural Sources

The management measures for agricultural sources are discussed together because the State intends to implement them using the following existing authority and programs:

- The primary authority is the Georgia Water Quality Control Act (OCGA 12-5-20), and the authority under which the Environmental Protection Division (EPD) of the Department of Natural Resources (DNR) is authorized to develop river basin management plans (OCGA 12-5-520). Upon adoption of a basin plan, all permitting and other activities under the control of the DNR are to be consistent with the plan. The Georgia Water Quality Control Act authorizes EPD to revise and enforce rules and regulations governing water quality and quantity, and set National Pollutant Discharge Elimination System permit conditions and effluent limits. To the extent that farmers fail to effectively manage pollutants originating on their site and cause pollution of state waters, the EPD enforces the Georgia Water Quality Control Act. If cooperation is not forthcoming or if the violation poses immediate threat to public safety and health, EPD may issue fines and seek court-enforced actions.

- The Georgia Soil and Water Conservation Commission (SWCC) is the lead agency for prevention of agricultural nonpoint pollution in the state. The SWCC develops nonpoint source water quality programs and conducts educational activities to promote conservation and protection of land and water resources devoted to agricultural use. Georgia's 40 Soil and Water Conservation Districts provide technical assistance to help local producers plan and establish needed soil and water conservation practices.

- An Agricultural/Irrigation Technical Task Force has developed a Best Management Practices (BMP) guide for farmers entitled "Agricultural Best Management Practices for Protecting Water Quality in Georgia." The BMP Guide is promoted by the SWCC and the Natural Resources Conservation Service through educational programs and BMP demonstration workshops. BMPs are also implemented through federal cost share programs such as the Conservation Reserve Program, and disincentives such as revocation of financial assistance through the Farm Bill Sodbusters Program and Conservation Compliance Program.

- The Georgia Farm Assessment System (Farm*A*Syst) is an interagency partnership that provides Georgia's farmers with information and a voluntary means to become environmentally pro-active in managing their farms and ultimately preventing pollution. This program, like the national program that it is modeled after, focuses on identifying potential sources of contamination, supplying information on corrective actions, and ultimately encouraging farmers to formulate an action plan to address concerns.

In order for the agricultural management measures to be approved, the State must meet the following conditions:

Conditions

- Within two years, Georgia will include in its program management measures for Facility Wastewater and Runoff from Confined Animal Facilities Management Measures (Large and Small Units) and Nutrient Management Measures in conformity with the 6217(g) guidance. The State will also include a legal opinion that clearly states that the backup authorities can be used to prevent nonpoint pollution and require management measure implementation.

1. Erosion and Sediment Control Management Measure

This management measure is intended to be applied to activities that cause erosion on agricultural lands and lands converted from other uses to agricultural lands. This includes cropland; irrigated cropland; range and pasture; orchards; permanent hayland; specialty crop production; and, nursery crop production. Application of this management measure will reduce the mass load of sediment and associated pollutants (e.g., nitrogen, pesticides) reaching a waterbody.

2. Management Measure for Facility Wastewater and Runoff from Confined Animal Facility Management (Large and Small units)

These management measures are intended to be applied to confined animal facilities. Application of these measures will reduce the volume of runoff, manure, and facility wastewater reaching a waterbody.

3. Nutrient Management Measure

This management measure is intended to be applied to activities associated with the application of nutrients to agricultural lands. Application of this measure will reduce the amount of nutrients entering both ground and surface waters.

4. Pesticide Management Measure

This management measure is intended to be applied to activities associated with the application of pesticides to agricultural lands. This measure will reduce contamination of surface and ground water by fostering effective and safe use of pesticides without causing environmental degradation.

In addition to the authorities described above, Georgia intends to rely on the following authority to implement the pesticide management measure:

- The Georgia Pesticide Control Act and the Georgia Pesticide Use and Application Act (O.C.G.A. 2-7-90 *et seq*), which are administered by the Georgia Department of Agriculture (GADOA), regulate the proper use and application of pesticides and the certification of pesticide applicators. This includes the licensing and certification of commercial and private pesticide applicators and pesticide contractors. Producers are trained in the management measures in the GADOA's pesticide applicators certification programs which are in compliance with the 6217

management measures. The GADOA is the primary agency responsible for administering and enforcing laws directly related to the registration, distribution, sale, use and application of pesticides in Georgia.

5. Grazing Management Measure

This management measure is intended to be applied to activities on range, irrigated and non-irrigated pasture, and other grazing lands used by domestic livestock. Its focus is on the riparian zone, but this measure also encourages the control of erosion from range, pasture, and other grazing lands above the riparian zone. Application of this management measure will improve aquatic habitat by reducing the amount of pollutants entering waters through proper livestock management.

In addition to the authorities described above, Georgia intends to rely on the following program to implement the grazing management measure:

- The Grazing Land Conservation Initiative is a national program that has been modified to meet the needs and practices in Georgia. It is a series of demonstration projects to improve management of pasture lands, reduce nutrient and sediment loadings, and improve water quality. The initiative provides three-day training classes to staff from agriculture agencies and provides technical assistance to livestock operators, producers, and consultants. The workshops and technical assistance include information on management measures in conformity with the (g) guidance.

6. Irrigation Water Management Measure

This management measure is intended to be applied to activities on irrigated lands, including agricultural crop and pasture land (except for isolated fields of less than 10 acres in size that are not contiguous to other irrigated lands); orchard land; specialty cropland; and nursery cropland. Application of this management measure will reduce the waste of irrigation water, improve water use efficiency, and reduce the total pollutant discharge from an irrigation system.

b. Urban Nonpoint Pollution Source Category

Section 3.B.2.c of this EA provides information on the population and growth patterns in Georgia. The population of the eleven-county coastal area increased from 503,748 in 1994 to 538,469 people in 1999. Although most of the population is located in the area of Savannah, Brunswick and Kingsland/St. Mary's, coastal Georgia is almost 67 percent rural and much of the coast remains largely undeveloped. As of the mid-1980's, only 4 percent of the coast was considered developed. Of that, only 3.3 percent was classified as residential, 0.3 percent as commercial, and 0.4 percent as industrial (NOAA/Georgia DNR, 1997). Tourism on Tybee Island, Sea Island, St. Simons Island, and Jekyll Island, as well as the presence of military bases in Camden, Long, and Liberty Counties has caused the coastal population to continue to increase. The metropolitan Savannah area is losing population as people move to the suburbs in Effingham and Bryan Counties.

Urban runoff and Individual Wastewater Treatment Systems are the major sources of

nonpoint pollution contributing to shellfish harvest limitations in Georgia's waters. According to the *National Shellfish Register of Classified Growing Waters* (NOAA, 1997), urban runoff was a contributing factor to water quality degradation that caused a prohibition on harvesting of shellfish in 9,453 acres of classified shellfish waters in Altamaha Sound. Urban runoff was also a contributing factor to restrictions on shellfishing in 19,005 acres of waters in the Brunswick River and 9,161 acres in Cumberland Sound. Malfunctioning on-site septic systems were also listed as a potential contributing factor to the harvest limitations in the same waterbodies.

Georgia's 1998-1999 305b Water Quality Assessment Report (Georgia DNR, 1999) identifies urban runoff from the city of Brunswick as the potential cause for 66 square miles of St. Simon's Sound and 1 square mile of Brunswick Harbor not fully supporting designated uses. Urban runoff in the Savannah area is the potential cause for 4 square miles of Savannah Harbor not fully supporting designated uses.

Management measures have been developed for the following six subcategories of sources of urban nonpoint pollution that affect Georgia's coastal waters:

- o Runoff from developing areas
- o Runoff from construction sites
- o Runoff from existing development
- o On-site disposal systems
- o General sources (households, commercial, and landscaping)
- o Roads, highways, and bridges

The Environmental Consequences section of the PEIS contains a description of the primary pollutants in urban runoff and an analysis of the impacts on water quality. The management measures are designed to prevent the environmental degradation caused by these pollutants.

The implementation of management measures for urban runoff will reduce the generation of nonpoint source pollutants from existing development and control runoff and treat pollutants associated with new development and redevelopment. The measures emphasize the control and removal of sediment and other suspended solids and pollutants entrained in runoff. The measures will minimize the transport of sediment and other pollutants (pesticides, fertilizers, petrochemicals, road salt, wood, garbage, paints and sealers) from new and existing development. The management measures pertaining to new and existing OSDS will reduce nutrient and pathogen loadings by: preventing the installation of conventional OSDS in areas where soil absorption systems will not provide adequate treatment of effluents; and, requiring that existing OSDS be modified, operated, repaired, and maintained to reduce pollutant loadings. The measures will require that roads, highways, and bridges are sited, constructed, operated, and maintained in order to protect sensitive ecosystems and reduce the generation and runoff of sediment, road salt, and other pollutants.

The implementation of management measures for urban runoff using the State programs and authorities discussed below will result in more consistent and widespread implementation of existing programs. The requirement for Georgia to include in its 6217 program management measures for the inspection of existing OSDS and for the protection of nitrogen-limited surface waters will provide an increased level of environmental protection by reducing loadings of

nitrogen and bacteria to coastal waters. Environmental benefits will be enhanced by the requirement for Georgia to ensure that existing management measures and enforceable policies and mechanisms are implemented throughout the 6217 management area.

Conditions

- Within two years, Georgia will include in its program a legal opinion that clearly states that the backup authorities can be used to prevent nonpoint pollution and require management measure implementation.

Management Measures for Urban Areas

1. New Development Management Measure

The New Development management measure is intended to be applied to control urban runoff and treat associated pollutants generated from new development, redevelopment, and new and relocated roads, highways, and bridges. The net result of this management measure will be increased watershed protection and a reduction in the erosion, flooding, and pollutants associated with poorly planned development.

Georgia proposes to address this management measure through a combination of regulatory authorities and voluntary mechanisms. Subject to the conditions noted, Georgia intends to rely on the following authorities and programs for implementation of the new development management measure:

- The Georgia EPD is the lead agency in management of urban runoff, and the primary authority is the Erosion and Sedimentation Act (ESA). In accordance with the ESA, most of the local governments within the 6217 management area have adopted general erosion and sedimentation ordinances and have been given authority, with oversight from EPD and the Soil and Water Conservation Districts (SWCD), to issue and enforce permits for land disturbing activities. In those areas where local governments have not been certified as an issuing authority, the EPD is responsible for issuing and enforcing land disturbance activities. The ESA requires permits for certain land disturbing activities and provides the authority for local governments to issue permits according to local ordinances. The ESA requires EPD to approve and periodically review local erosion and sediment control programs.

- All surface mines in Georgia are required to obtain a mining permit. The permit, issued by the EPD, requires that the owner develop a land use plan, detailing erosion control measures and reclamation.

- The Water Quality Control Act can be used as a back-up enforcement mechanism for activities exempted under the Erosion and Sediment Control Act.

Conditions

This management measure is approved with the following conditions:

- Within two years, Georgia will include in its program management measures in conformity with the 6217(g) guidance. Within one year Georgia will develop a strategy to implement the management measure throughout the 6217 management area. For activities

exempted by the Erosion and Sedimentation Act, the state needs to strengthen its description of the voluntary or incentive based programs to implement the new development management measure, the description of the mechanism or process linking the implementing agency with the enforcement agency and its commitment to use the enforcement authority where necessary.

2. Watershed Protection and Existing Development Management Measures

These two management measures are discussed together because the State intends to implement them using the same state programs.

The Watershed Protection management measure is intended to be applied to new development or redevelopment including construction of new and relocated roads, highways, and bridges that generate nonpoint source pollutants. Application of this management measure will reduce the generation of nonpoint source pollutants and mitigate the impacts of urban runoff.

The Existing Development management measure is intended to be applied to all urban areas and existing development in order to reduce surface water runoff pollutant loadings from such areas. Application of this measure will protect or improve surface water quality by developing and implementing watershed management programs.

Subject to the conditions noted, Georgia intends to rely on the following programs and authorities for implementation of the watershed protection and existing development management measures:

- The River Basin Management Planning (RBMP) approach to watershed protection (River Basin Management Planning Act OCGA 12-5-520) provides a framework of programs that collectively conform to the Watershed Protection and Existing Development measures. The River Basin Management Planning Act specifies that each plan include a description of the goals of the management plan.

- The Mountain and River Corridor Protection Act (OCGA 12-2-8) and the Georgia Planning Act (OCGA 12-2-8) provide minimum planning standards that deal specifically with the protection of water supply watersheds, groundwater recharge areas, wetlands, river corridors, and mountains. These criteria were developed by the Department of Natural Resources (DNR) as mandated in the two Acts. The criteria include vegetative buffers on streams and reservoirs, land use planning, river corridor protection plans, land development densities, and land use activities. The Metropolitan River Protection Act, Georgia Planning Act, state and local floodplain management programs, capital improvement programs, and other similar initiatives all play a role in helping the state meet these measures.

- The Source Water Assessment and Protection Act (SWAPP) is charged with delineating watersheds and wellhead protection areas of public drinking water sources, conducting inventories of potential sources of contamination, and determining water source's susceptibility to significant potential contaminants within the assessment area. Once this information is available, a plan will be developed for reducing and preventing contamination of watersheds and wellhead protection areas.

- The University of Georgia Marine Extension Service and the Coastal Resource Division are launching a statewide Nonpoint Source Education for Municipal Officials (NEMO) program

aimed at local government officials. NEMO provides local officials with strategies and tools to deal with nonpoint source pollution problems. It will be a primary mechanism for establishing practical and cost-effective methods of reducing nonpoint source pollution.

- Numerous other public education documents have been targeted at watershed protection including Environmental Management Requirements for Stream and River Corridors in Georgia, Land Development Provisions to Protect Georgia Water Quality, A Georgia Guide to Controlling Erosion with Vegetation, Guidelines for Streambank Restoration, and Landowners' Guide to Wetlands and Watersheds.

Conditions

These management measures are approved with the following conditions:

- Within two years, Georgia will include management measures in conformity with the 6217 (g) guidance and within one year will include in its five-year program implementation strategy a plan to implement the management measures throughout the 6217 management area.

3. Site Development Management Measure

The Site Development management measure is intended to be applied to all site development activities including those associated with roads, highways, and bridges. Application of this management measure will reduce the generation of nonpoint source pollution and mitigate the impacts of urban runoff through proper design and development of individual sites.

Georgia intends to rely on the following authorities for implementation of the site development management measure:

- The Georgia Erosion and Sedimentation Act (OCGA 12-7-1) requires permits for land disturbing activities and provides authority for local governments to issue permits according to local ordinances. The Act requires EPD to approve and periodically review local erosion and sediment control programs. For exempt activities, the Act requires new construction practices to comply with BMPs contained in the Manual for Erosion and Sediment Control in Georgia, which meet the (g) management measures. The Manual includes requirements for a Land Disturbing Activity Plan, an Erosion and Sediment Control Plan, and provides a Model Soil Erosion and Sedimentation Control Ordinance. The Land-Disturbing Activity Plan requires natural vegetative buffers of 25 feet measured from the stream banks (100 feet measured horizontally, adjacent to trout streams), minimizing disturbed areas, and stabilizing disturbed areas immediately. In addition, the Source Water Assessment and Protection Act requires a plan for protecting watersheds and wellhead areas.

- The Georgia Water Quality Control Act will be used as a backup enforceable policy for activities exempted from the Erosion and Sedimentation Act.

4. Construction Site Erosion and Sediment Control Management Measure

The Construction Site Erosion and Sediment Control management measure is intended to be applied to all construction activities on sites less than five acres in areas that do not have an NPDES permit in order to control erosion and sediment loss from those sites. This measure does

not apply to: (1) construction of a detached single family home on a site of one-half acre or more or (2) construction that does not disturb over 5,000 square feet of land on a site. Application of this management measure will minimize the sediment being transported outside the perimeter of a construction site by reducing erosion and retaining sediment onsite.

Georgia intends to rely on the following authority for implementation of the site development management measure:

- The policy of NOAA and EPA is to defer to NPDES Phase II permitting program for the Construction Site Erosion and Sediment Control management measure.

5. Construction Site Chemical Control Management Measure

The Construction Site Chemical Control Management Measure is intended to be applied to all construction sites less than five acres in area and to new, resurfaced, restored, and reconstructed road, highway, and bridge construction projects. This management measure does not apply to: (1) construction of a detached single family home on a site of one-half acre or more or (2) construction that does not disturb over 5,000 square feet of land on a site. Application of this management measure will prevent the generation of pollutants at construction sites due to improper handling and usage, and prevent their movement from the construction site.

Subject to the conditions noted, Georgia intends to rely on the following programs for implementation of the construction site erosion and sediment control and chemical control management measures:

- Georgia proposes to address this management measure through the GDOT Worksite Erosion Control Manual, the Commercial Pesticide Applicator certification program, and distribution of a Construction Site Chemical Control Handbook, which has yet to be developed.

Conditions

These management measures are approved with the following conditions:

- Within two years, Georgia will include in its program management measures in conformity with the 6217(g) guidance. Within one year Georgia will develop a strategy (as part of the 5-Year Implementation Strategy) to implement the management measure throughout the 6217 management area.

6. New Onsite Disposal Systems Management Measure and Operating Onsite Disposal Systems Management Measure

These two management measures are discussed together because the State intends to implement them using the same State programs.

The New Onsite Disposal System management measure is intended to be applied to all new OSDS including package plants and small-scale or regional treatment facilities not covered by NPDES regulations in order to manage the siting, design, installation, and operation and maintenance of all such OSDS. Application of this measure will prevent the installation of

conventional OSDS in areas where soil absorption systems will not provide adequate treatment of effluents prior to entry into surface or ground waters.

The Operating Onsite Disposal Systems management measure is intended to be applied to all operating OSDS. This measure will minimize pollutant loadings from operation OSDS by requiring that they be modified, operated, repaired, and maintained to reduce nutrient and pathogen loadings in order to protect and enhance surface waters.

Subject to the condition noted, Georgia intends to rely on the following programs and authorities for implementation of the new and operating onsite disposal systems management measures:

- The Georgia Department of Human Resources (GADHR) has primary authority to regulate individual onsite disposal systems, including septic systems. Enforcement is through Title 31 Chapter 3 of OCGA 31-3 which describes the establishment of County Boards of Health, which have the responsibility for enforcing regulations for OSDS. Each of the eleven counties in the 6217 management area has a health board, and each has adopted rules for implementing OCGA 31-3. GADHR Rules (Chap. 290-5-26) require that new OSDSs are located, designed, installed, operated, inspected to prevent the discharge of pollutants.

- GADHR and EPD have developed a formal Memorandum of Understanding, whereby GADHR will not permit any non-domestic septic system that accepts chemical wastes that could pollute groundwater.

Condition

These management measures are approved with the following condition:

- Within three years Georgia will include in its program management measures for inspection and maintenance of existing OSDS and protection of nitrogen-limited surface waters in conformity with the 6217(g) guidance.

5. Pollution Prevention Management Measure

This management measure is intended to be applied to reduce the generation of nonpoint source pollution throughout the section 6217 management area by preventing and reducing pollutant loadings generated from a variety of activities within urban areas not addressed by other management measures in this source category. It is meant to ensure that communities implement solutions that may result in behavioral changes that reduce the generation of pollutants, thus reducing water quality impacts from these sources.

This measure does not require enforceable policies. Georgia has a variety of pollution prevention and education programs including the Pollution Prevention Assistance Division (P2AD) of the Georgia DNR which provides educational assistance to citizens, community groups, industry, and schools, the University of Georgia Horticulture Extension Service which is developing guidelines and educational material for turf management throughout Georgia, and Adopt-A-Highway and Adopt-A-Stream programs.

Georgia has developed several good documents aimed at pollution prevention including Environmental Management Requirements for Stream and River Corridors in Georgia, Land

Development Provisions to Protect Georgia Water Quality, A Georgia Guide to Controlling Erosion with Vegetation, Guidelines for Streambank Restoration, and Landowners' Guide to Wetlands and Watersheds.

6. Management Measures for Roads, Highways and Bridges

The six management measures pertaining to roads, highways, and bridges are discussed together because the State intends to implement them using same state programs.

The management measure for Planning, Siting, and Developing is intended to be applied to site development and land disturbing activities for new, relocated, and reconstructed roads and highways in order to reduce the generation of nonpoint source pollutants and to mitigate the impacts of urban runoff from such activities. This measure emphasizes the importance of planning to identify potential problems early in the design process.

The management measure for Bridges is intended to be applied to new, relocated, and rehabilitated bridge structures in order to control erosion, streambed scouring, and surface runoff from such activities. This will ensure that bridges will not be sited over sensitive waters and tributaries in the coastal zone.

The management measure for Construction Projects is intended to be applied to new, replaced, restored, and rehabilitated road, highway, and bridge construction projects in order to control erosion and offsite movement of sediment from such project sites. This measure emphasizes the importance of erosion and sediment control plans as effective methods in mitigating erosion problems at construction sites before any land-disturbing activity begins.

The management measure for Construction Site Chemical Control is intended to be applied to new, resurfaced, restored, and rehabilitated road, highway, and bridge construction projects in order to reduce toxic and nutrient loadings from such project sites. The objective of this measure is to safeguard surface and ground waters from toxic spills and hazardous loadings at construction sites from equipment and fuel storage, and also from road salt, fertilizers, and pesticides stored at maintenance areas.

The management measure for Operation and Maintenance is intended to be applied to existing, restored, and rehabilitated roads, highways, and bridges. This measure will ensure that pollutants generated by operation and maintenance procedures for roads, highways, and bridges, and from sparsely vegetated areas, cracked pavements, potholes, and poorly operating urban runoff control structures, are minimized through the development and implementation of a program that includes standard operating procedures and maintenance guidelines.

The management measure for Road, Highway, and Bridge Runoff Systems is intended to be applied to existing, resurfaced, restored, and rehabilitated roads, highways, and bridges that contribute to adverse impacts to surface waters. Surface waters will be protected through the use of runoff management systems such as vegetated filter strips, grassed swales, detention basins, constructed wetlands, and infiltration trenches.

Subject to the conditions noted, Georgia intends to rely on the following programs and authorities for implementation of the roads, highways and bridges management measures.

- The Georgia Erosion and Sedimentation Act is proposed as an enforceable policy and

mechanism, and the Water Quality Control Act is the overall backup authority.

- Georgia proposes to use several non-regulatory methods to implement the roads, highways and bridges management measures. They include the GDOT Design Guidelines, GDOT Standard Specifications and Special Provisions - Construction of Transportation Systems, and GDOT Construction Guidelines, and the GDOT Work Site Erosion Control Manual.

Conditions

These management measures are approved with the following conditions:

- Within two years, Georgia will include in its program management measures in conformity with the 6217(g) guidance. Within one year Georgia will develop a strategy to implement the management measures throughout the 6217 management area.

c. Forestry Nonpoint Pollution Source Category

Georgia has not provided sufficient justification to support a categorical exclusion of forestry from its coastal nonpoint program. Section 3.B.2.b of this EA discusses forestry activities in Georgia. The forestry source category was not excluded because Georgia has not demonstrated that forestry sources do not, individually or cumulatively, present significant adverse effects to its coastal waters. Commercial forests cover over 2.6 million acres or 71% of the land area in the 11 coastal counties. Timber activities include forestry management and harvesting, paper pulp processing, distilling pine products and timber production.

Georgia's 1998-1999 305(b) Water Quality Assessment Report did not identify any streams in the state that are impaired by silviculture activities (in NOAA/Georgia DNR, 1997). The sandy coastal plain soils mitigate water quality impacts from forestry operations.

The implementation of forestry management measures will reduce the runoff of pollutants to surface waters and mitigate the impacts associated with forestry activities. The forestry management measures emphasize advanced planning for forest harvesting and for locating, designing, and managing forest road systems. The management measures provide for the establishment of streamside management areas along surface waters to buffer against detrimental changes to the streams caused by sediment and loss of canopy species. The management measures for road construction and road management will reduce erosion and runoff of sediment by minimizing the disturbance of soils and by maintaining road stability. Management measures for site preparation, forest regeneration, and revegetation of disturbed areas will help to stabilize disturbed soils, control erosion, increase rainfall infiltration, and prevent sediment and associated pollutants from entering nearby surface waters. Implementation of the forest chemical management measure will ensure that the application of fertilizers and pesticides during forestry operations will not adversely affect water quality. The management measure for wetlands forests addresses the special operating circumstances and management practices appropriate for forested wetlands in order to maintain their ability to alter floodflow, remove nutrients, and provide habitat.

The environmental benefits that result from the implementation of management measures for forestry will be a more widespread and more consistent implementation of existing forestry management practices specified in the *Best Management Practices for Forestry Handbook*.

Management measures have been developed for the following six subcategories of sources of forestry nonpoint pollution that affect coastal waters:

- o Road construction and use
- o Timber harvesting
- o Regeneration methods
- o Site preparation
- o Prescribed burning
- o Application of forest chemicals

In order for the management measures to be approved, the State must meet the following conditions:

Conditions

- Within two years, Georgia will include in its program a legal opinion that clearly states that the backup authorities can be used to prevent nonpoint pollution and require management measure implementation.

Management Measures for Forestry

Georgia's program includes management measures in compliance with the 6217(g) guidance for forestry. All forestry management measures are discussed together because the State intends to implement them using the same state programs. Georgia intends to rely on the following programs and authorities for implementation of the management measures:

- The Georgia Forestry Commission (GFC) is the lead state agency responsible for supervising forestry operations in Georgia. Georgia has a comprehensive *Best Management Practices for Forestry* handbook which addresses the management measures. These include guidelines for streamside management zones, permanent access roads and road construction, timber harvesting, reforestation, and forest chemical use. Education and outreach programs have been instrumental in increasing adoption of these practices.
- The Official Code of Georgia provides for the establishment of a State Board of Registration for Foresters, as well as standards of practice for the forest industry. This board assures that each registered forester practices professional forestry in a manner which protects public welfare and safety. The accepted standards of practice include the BMPs listed in the forestry BMP manual.
- Georgia submitted a legal opinion demonstrating that Georgia "has in place comprehensive statutory authority to develop and implement measures for the management of non-point sources of water pollution consistent with the goals of Section 6217."

1. Preharvest Planning

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. The planning process components of this management measure are intended to apply to commercial harvesting on areas greater than 5 acres and any associated road

system construction or reconstruction conducted as part of normal silvicultural activities. Through its advance planning process, this measure will ensure that silvicultural activities, including timber harvesting, site preparation, and associated road construction, are conducted without significant nonpoint source pollution delivery to streams and coastal areas.

2. Streamside Management Areas (SMAs)

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It is intended to apply to surface waters bordering or within the area of operations. The vegetation in SMAs will protect water quality and aquatic habitat by reducing runoff and trapping sediment and nutrients before they reach surface waters. Canopy species serve to moderate water temperatures by providing shade. They also provide the detritus for the detrital food chain, stabilize stream banks, and provide habitat for aquatic and terrestrial organisms.

3. Road Construction/Reconstruction

This management measure is intended for application on lands where silvicultural or forestry operations are planned or conducted. It applies to the clearing, pioneering, construction, and surfacing phases of road development. This management measure will reduce erosion and the runoff of sediment to surface waters by minimizing the disturbance of soil and rock during road development.

4. Road Management

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It applies to active and inactive roads constructed or used for silvicultural activities. This management measure will protect water quality by managing existing roads to maintain stability and utility in order to minimize sedimentation and pollution from runoff-transported materials.

5. Timber Harvesting

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It is intended to apply to all harvesting, yarding, and hauling conducted as part of normal silvicultural activities on harvest units larger than 5 acres. This management measure will protect water quality by locating landings according to preharvest planning thus minimizing sedimentation resulting from the siting and harvesting of timber, and by properly managing petroleum products.

6. Site Preparation and Forest Regeneration

This management measure pertains to lands where silvicultural or forestry operations are

planned or conducted. It is intended to apply to all site preparation and regeneration activities conducted as part of normal silvicultural activities on harvested units larger than 5 acres. Regeneration of harvested forest lands provides water quality protection by stabilizing disturbed soils. Tree roots hold soil in place and aid soil aggregation, decreasing the potential for slope failure. Vegetation decreases erosion by slowing storm runoff. Maintenance of an unbroken forest litter layer prevents raindrop detachment, maintains infiltration, and slows runoff.

7. Fire Management

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It is intended to apply to all prescribed burning conducted as part of normal silvicultural activities on harvested units larger than 5 acres and for wildfire suppression and rehabilitation on forest lands. This management measure will minimize potential nonpoint source pollution by reducing erosion and sedimentation resulting from these operations.

8. Revegetation of Disturbed Areas

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It is intended to apply to all disturbed areas resulting from harvesting, road building, and site preparation conducted as part of normal silvicultural activities. Disturbed areas are those localized areas within harvest units or road systems where mineral soil is exposed or agitated (e.g., road cuts, fill slopes, landing surfaces, cable corridors, or skid trail ruts). Revegetation of disturbed areas will prevent sediment and associated pollutants from entering nearby surface waters. Vegetation controls erosion by dissipating the erosive forces of raindrops, reducing the velocity of runoff, stabilizing soil particles, and increasing soil infiltration rates.

9. Forest Chemical Management

This management measure pertains to lands where silvicultural or forestry operations are planned or conducted. It is intended to apply to all fertilizer and pesticide applications (including biological agents) conducted as part of normal silvicultural activities. Chemicals can directly enter surface waters through five major pathways: direct application, drift, mobilization in ephemeral streams, overland flow, and leaching. Direct application is the most important pathway and is one of the most easily prevented by this management measure. Providing buffer areas around streams and waterbodies is an example of an effective method of preventing the chemicals from adversely affecting water quality.

10. Wetlands Forest

This management measure is intended for forested wetlands where silvicultural or forestry activities are planned or conducted. It is intended to apply specifically to forest management activities in forested wetlands and to supplement the previous management measures

by addressing the operational circumstances and management practices appropriate for forested wetlands. This management measure will help to reduce incidental or indirect effects on forested wetlands whose beneficial functions include floodflow alteration, sediment trapping, nutrient retention and removal, and provision of habitat.

d. Marinas and Recreational Boating Nonpoint Source Category

Section 3.B.2.d of this EA provides information on the extent of marina activities in Georgia. Because of the extent of recreational boating activities and the large number of marinas in Georgia, nonpoint source pollution from these activities poses a threat to coastal waters in certain areas. Potential nonpoint source problems can be attributed to poor marina siting and design, maintenance dredging, routine marina operation, and boat operations. Pollutants from the operation and maintenance of marinas can also combine with other upland sources such as stormwater runoff and leachate from septic systems to cause significant water quality problems in localized areas. Pollutants such as heavy metals, toxins, hydrocarbons, bacteria, and nutrients can enter coastal waters as a result of marina and boating activities.

Georgia's 1990-1991 305(b) Water Quality Assessment Report (Georgia DNR, 1991) identified several locations where marinas and boating activities were a source of nonpoint pollution. Pathogens attributed to marinas operations were responsible for shellfish area closures in the Wassaw, St. Catherine's, Sapelo, and Doboy estuaries. Georgia's 1998-1999 305(b) report (Georgia DNR, 1999) lists marinas as the potential cause for 17 square miles of water in Doboy Sound, 24 square miles in Sapelo Sound, and 25 square miles in St. Catherine's Sound as not fully supporting designated uses.

Management measures have been developed for the following five subcategories of sources of nonpoint pollution from marinas and recreational boating that affect Georgia's coastal waters:

- o Poorly flushed waterways where dissolved oxygen deficiencies exist,
- o Pollutants discharged from boats,
- o Pollutants transported in storm water runoff from parking lots, roofs, and other impervious surfaces,
- o The physical alteration or destruction of wetlands and of shellfish and other bottom communities during the construction of marinas, ramps, and related facilities, and
- o Pollutants generated from boat maintenance activities on land and in the water

Fifteen management measures specified for this source category are grouped under two broad headings: (1) siting and design, and (2) operation and maintenance. Effective implementation of these measures will avoid impacts associated with marina siting and prevent the introduction of nonpoint source pollutants.

The six main impacts from the pollutants associated with marina and boating activities that affect water quality include: toxicity in the water column; increased pollutant levels in aquatic organisms; increased pollutant levels in sediments; increased levels of pathogen indicators; disruption of sediment and habitat; and, shoaling and shoreline erosion. The Environmental Consequences section of the PEIS contains an analysis of the impacts of these pollutants on water

quality. The management measures are designed to prevent the environmental degradation caused by these pollutants.

The implementation of management measures for marinas and recreational boating will reduce the runoff of pollutants to marina waters and mitigate the impacts associated with the siting and design and the operation and maintenance of new and expanding marinas. Management measures for siting and design will control stormwater runoff from marina parking lots and hull maintenance areas thereby reducing the amount of suspended solids, oil, and grease entering marina waters. The measures will protect wetlands, shellfish beds and submerged aquatic vegetation during marina construction; will provide for water quality assessments to determine whether the marina design will affect water quality; will ensure proper circulation for flushing of the marina basin; and will reduce turbidity and shoaling by protecting against shoreline erosion. The measures for operation and maintenance emphasize the proper disposal of fish and solid wastes and the storage, transfer, containment, and disposal of sewage, oil, antifreeze, solvents, and paints. Restrictions on boating activities in shallow non-marina waters will protect shallow-water habitats and prevent resuspension of sediments and damage to submerged aquatic vegetation.

The environmental benefits that result from the implementation of management measures based on the existing State programs and authorities discussed below will be enhanced by the utilization of the *Best Environmental Practices for Georgia Marinas guidebook* to educate marina developers, operators, and users about the BMPs contained in the book.

Management Measures for Marinas and Recreational Boating

The fifteen management measures pertaining to marinas are all discussed together because the State intends to implement them using the following state programs:

- The Coastal Marshlands Protection Act and Shore Protection Act provide enforceable policies and mechanisms to implement the measures (for new and expanding marinas within the jurisdiction of those acts). For marina operation everywhere and new and expanding marinas outside the jurisdiction of the Marsh and Shore Acts, Georgia cites the Water Quality Control Act as a back up authority that can be used to prevent nonpoint source pollution and implement management measures, as necessary. The state submitted a legal opinion demonstrating how the Act may be used.

- The *Best Environmental Practices for Georgia Marinas* guidebook. The guidebook references the §6217(g) measures and contains practices that could implement all of the marina siting, design, operation, and maintenance measures

Siting and Design

1. Marina Flushing Management Measure

This management measure is intended to be applied to new and expanding marinas. Initial site selection is the most important factor influencing the long-term impact a marina will

have on water quality within the immediate vicinity of the marina.

2. Water Quality Assessment Management Measure

This management measure is intended to be applied to new and expanding marinas. Water quality assessments such as modeling of flushing rates, measuring water quality characteristics, and monitoring may be used to determine whether a proposed marina design will adversely affect water quality.

3. Habitat Assessment Management Measure

This management measure is intended to be applied to new and expanding marinas where site changes may impact on wetlands, shellfish beds, submerged aquatic vegetation, or other important habitats. Proper siting and design can reduce short-term impacts (habitat destruction during construction) and long-term impacts (water quality, sedimentation, circulation) on the surrounding environment.

4. Shoreline Stabilization Management Measure

This management measure is intended to be applied to new and expanding marinas where site changes may result in shoreline erosion. This measure has been shown to be effective in mitigating shoreline erosion and the resulting turbidity and shoaling.

5. Storm Water Runoff Management Measure

This management measure is intended to be applied to new and expanding marinas, and to existing marinas for at least the hull maintenance areas. Pollutants can be controlled through three techniques: filtration/infiltration; retention/detention; and, physical separation.

6. Fueling Station Design Management Measure

This management measure is intended to be applied to new and expanding marinas where fueling stations are to be added or moved. Marinas should be located and designed and a spill contingency plan developed so that pollutants released during fueling operations can be contained in a limited area to minimize spread through and out of the marina.

7. Sewage Facility Management Measure

This management measure is intended to be applied to new and expanding marinas in areas where adequate marine sewage collection facilities do not exist. The availability and use of these systems will reduce discharges of sanitary wastes to coastal waters.

Operation and Maintenance

1. Solid Waste Management Measure

This management measure is intended to be applied to new and expanding marinas. If adequate disposal facilities are available there is less likelihood for disposal of solid waste in surface waters or on shore where the material may wash into the waters.

2. Fish Waste Management Measure

This management measure is intended to be applied to marinas where fish waste is determined to be a source of water pollution. Marina patrons and employees are more likely to properly dispose of fish waste if told of potential environmental effects and provided adequate and convenient disposal facilities.

3. Liquid Material Management Measure

This management measure is intended to be applied to marinas where liquid materials used in the maintenance, repair, or operation of boats are stored. This measure minimizes entry of potentially harmful liquid materials into marina and surface waters through proper storage and disposal.

4. Petroleum Control Management Measure

This management measure is intended to be applied to boats that have inboard fuel tanks. The amount of fuel and oil entering marina and surface waters can be reduced by using devices such as automatic shut-off nozzles, fuel/air separators, and oil-absorbing bilge pads.

5. Boat Cleaning Management Measure

This management measure is intended to be applied to marinas where boat topsides are cleaned and marinas where hull scrubbing in the water has been shown to result in water quality problems. This measure minimizes the use and release of potentially harmful cleaners and bottom paints to marina and surface waters.

6. Public Education Management Measure

This management measure is intended to be applied to all environmental control authorities in areas where marinas are located. The best method of preventing pollution from marinas and boating activities is to educate the public about the causes and effects of pollution and methods to prevent it.

7. Maintenance of Sewage Facilities Management Measure

This management measure is intended to be applied to marinas where marine sewage disposal facilities exist. This measure is effective in preventing failure of pumpouts and discourages improper disposal of sanitary wastes thus reducing the release of untreated sewage into marina and surface waters.

8. Boat Operation Management Measure (applies to boating only)

This management measure is intended to be applied in non-marina surface waters where evidence indicates that boating activities are impacting shallow-water habitats. Boat operation in shallow water can resuspend bottom sediment, increase turbidity, and damage submerged aquatic vegetation. This management measure will minimize damage to sensitive habitats by excluding boats from shallow-water areas not suitable for boat traffic because of their ecological importance. Establishing no-wake zones will minimize the indirect impacts of increased turbidity.

e. Hydromodification Nonpoint Pollution Source Category

Dams and reservoirs are not expected to be a controversial issue in the coastal area. The coastal rivers are broad, slow-moving and pass through flat, low-lying areas and have limited suitability for hydroelectric projects. Dams and reservoirs provide for drinking water storage and recreation and may become important factors in the future (NOAA/Georgia DNR, 1997). Dams are associated with ponds used for sewage treatment, fish farming, livestock watering, and irrigation. There are 42 dams in the Georgia coastal zone that meet the following 6217(g) definition for dams:

- Constructed impoundments 25 feet or more in height and greater than 15 acre-feet in capacity, or;
- Constructed impoundments 6 feet or more in height and greater than 50 acre-feet in capacity.

The median height of the dams is six feet; the median volume is 150 acre-feet. The dams are low structures with small hydraulic heads, limited storage area, and no active manipulation of water release.

Dredging in coastal Georgia is primarily performed by the U.S. Corps of Engineers. An average of 7.83 million cubic yards of sediment are removed from the Savannah Harbor annually; 1.8 million cubic yards are removed from the Port of Brunswick; and, about 3 million cubic yards of shoal material are removed from the Atlantic Intracoastal Waterway. The State provides 83 dredged material disposal sites, not diked, along the Waterway (NOAA/Georgia DNR, 1997). Some dredging occurs for sand, gravel and shell. Channelization projects in Georgia are undertaken for the purposes of flood control, drainage improvement, navigation, and the stabilization of channels and banks. A great majority of channelization projects in Georgia consist of maintenance dredging. According to the Georgia 305(b) Water Quality Assessment Report (Georgia DNR, 1991), sediment and low dissolved oxygen caused by dredging in the Intracoastal Waterway was responsible for the killing of over 1,900 fish in Jekyll Basin.

Shoreline and streambank erosion is a problem in Georgia. Shoreline erosion of beaches is

of major concern on 19 miles out of the 88 miles of beaches. Significant erosion in tidal rivers has occurred along the Ogeechee River and the Crooked River at Elliot's Bluff.

Approximately 16 of the total 19 miles on the four developed barrier islands have been "armored" at some point in time by either a vertical concrete seawall, rock revetments, or both. Six beach renourishment projects have been carried out on Sea Island and Tybee Island since 1975. Both islands have incorporated the use of sand management structures, i.e., groins and breakwater structures, to retain sand placed on the beaches during renourishment. Sand dunes have also been reconstructed and vegetated on both islands as part of their beach nourishment (The Georgia Sound, 1998).

Management measures for the following three subcategories of sources of nonpoint pollution from hydromodification activities that affect Georgia's coastal waters will be implemented as part of the State's coastal nonpoint program:

- o Channelization and channel modification
- o Dams
- o Streambank and shoreline erosion

The main effects of the pollutants associated with hydromodification activities that affect water quality include: changed sediment supply, reduced availability of fresh water, accelerated delivery of pollutants, loss of surface water contact with overbank areas, loss or alteration of wetlands and instream and riparian habitats, blocked or impeded migration routes of fish, and increased sediment and nutrient levels. The Environmental Consequences section of the PEIS contains an analysis of the impacts of these pollutants on water quality. The management measures are designed to prevent the environmental degradation caused by these pollutants.

The implementation of management measures for hydromodification activities are intended to prevent degradation of the physical and chemical characteristics of surface waters and detrimental changes to instream and riparian habitat resulting from the transport of pollutants and from alterations in the supply of sediment and freshwater. The measures will minimize erosion, control sediment runoff, prevent downstream contamination from pesticides, petrochemicals, fertilizers, lime, cement, and construction chemicals, and protect the quality of water and aquatic habitat in reservoirs. The measures will also protect eroding streambank and shorelines that constitute a nonpoint pollution source that contributes to increased turbidity and nutrient levels in coastal waters.

The implementation of management measures for hydromodification activities using the State programs and authorities discussed below will result in a more consistent and widespread implementation of the existing programs through fulfillment of the requirement for Georgia to include in its 6217 program management measures in conformity with the 6217(g) guidance and to develop a strategy to implement the measures throughout the management area.

Management Measures for Hydromodification

Channelization and Channel Modification

1. Management Measures for Physical and Chemical Characteristics of Surface Waters and Instream and Riparian Habitat Restoration

The management measure for Physical and Chemical Characteristics of Surface Waters is intended to be applied to public and private channelization and channel modification activities in order to prevent the degradation of physical and chemical characteristics of surface waters from such activities. The purpose of this management measure is to ensure that the planning process for new hydromodification projects addresses changes to physical and chemical characteristics of surface waters that may occur as a result of the proposed work.

The management measure for Instream and Riparian Habitat Restoration pertains to surface waters where channelization and channel modification have altered or have the potential to alter instream and riparian habitat such that historically present fish or wildlife are adversely affected. The purpose of this management measure is to correct or prevent detrimental changes to instream and riparian habitat from the impacts of channelization and channel modification projects.

Subject to the conditions noted, Georgia intends to rely on the following programs and authorities for implementation of these management measures:

- The Coastal Marshlands Protection Act (OCGA 12-5-280), the Shore Protection Act (OCGA 12-5-230), and the Georgia Erosion and Sedimentation Act (OCGA 12-7-1) are proposed as enforceable policies and mechanisms to meet the measures. For activities outside the jurisdiction of those acts, the Water Quality Control Act provides the authority to implement the measures, where necessary.

- Georgia has a permitting process for channelization projects in freshwater and saltwater areas. For projects in estuarine areas, applicants must file a joint permit application operated through the Coastal Resources Division and the Army Corps of Engineers. The permits evaluate the impact of the activity on the estuary and on other resource interests in the vicinity such as recreational boating and shellfish harvest sites. The permit application is presented to the Coastal Marshlands Protection Committee which evaluates it for potential to obstruct or harmfully alter the natural flow of navigable water, increase erosion, or interfere with recreational and commercial fishing and shellfish harvesting, whether physically or due to alterations in water quality. The joint application includes an application for a Revocable License to transgress on state-owned water bottoms, and, in the event of a 404 designation, a Clean Water Act section 401 water quality certification issued by the EPD.

- Georgia will also use the §401 certification process, under the federal Clean Water Act, administered by the EPD. The 401 water quality certification program provides a mechanism for ensuring that state water quality standards are imposed for freshwater projects, as well as any other activity requiring a federal permit.

Conditions

- Within two years, Georgia will include in its program measures that are in conformity with the 6217 (g) guidance for hydromodification. Within one year, Georgia will develop a strategy to implement the management measures throughout the 6217 management area.

Streambank and Shoreline Erosion

1. Management Measure for Eroding Streambanks and Shorelines

This management measure is intended to be applied to eroding shorelines in coastal bays, and to eroding streambanks in coastal rivers and creeks. This measure applies only to eroding shorelines and streambanks that constitute a nonpoint source pollution problem in surface waters. The application of vegetative or engineering stabilization techniques are effective in controlling coastal erosion. These techniques also serve to halt the destruction of wetlands and riparian areas.

Subject to the conditions noted, Georgia intends to rely on the following authorities for implementation of this management measure:

- The Georgia Erosion and Sedimentation Act, Georgia Water Quality Control Act, Federal Rivers and Harbors Act, Georgia Stormwater Management Program, and the Nationwide 13 permit will be used to address this management measure.

Conditions

- Within two years, Georgia will include in its program measures that are in conformity with the 6217 (g) guidance. Within one year, Georgia will develop a strategy to implement the management measures throughout the 6217 management area.

Dams

1. Management Measures for Erosion and Sediment Control, Chemical and Pollutant Control, and Protection of Surface Water Quality and Instream and Riparian Habitat

The management measure for Erosion and Sediment Control is intended to be applied to the construction of new dams, as well as to construction activities associated with the maintenance of dams. The purpose of this measure is to prevent sediment from entering surface waters during the construction or maintenance of dams. The purpose of this measure is to prevent sediment from entering surface waters by minimizing erosion and maximizing sediment retention onsite to reduce impacts on surface water quality.

The management measure for Chemical and Pollutant Control is intended to be applied to the construction of new dams, as well as to construction activities associated with the maintenance of dams. The purpose of this measure is to prevent downstream contamination from pollutants such as pesticides, petrochemicals, fertilizers, lime, cement, and construction chemicals. This measure will provide for retention onsite of the soluble pollutants that are not easily controlled by erosion and sediment control practices.

The management measure for Protection of Surface Water Quality and Instream and Riparian Habitat is intended to be applied to dam operations that result in the loss of desirable surface water quality, and of desirable instream and riparian habitat. The purpose of this measure is to protect the quality of surface waters and aquatic habitat in reservoirs and in the downstream portions of rivers and streams that are influenced by the quality of water contained in the releases (tailwaters) from reservoir impoundments.

Subject to the condition noted, Georgia intends to rely on the following authority for implementation of the management measure for Erosion and Sediment Control:

- Georgia meets the management measure for erosion and sedimentation control through the Erosion and Sedimentation Control Act which requires the implementation of BMPs in accordance with the Manual for Erosion and Sediment Control in Georgia.

Condition

- Within two years, Georgia will include in its program measures that are in conformity with the 6217 (g) guidance.

f. Wetlands, Riparian Areas, and Vegetated Treatment System

According to the U.S. Fish and Wildlife Service, Georgia has lost about 25 percent of its total wetlands since 1780. During the period between 1950 and 1970, Georgia lost an estimated 7,300 acres of wetlands a year (NOAA/Georgia DNR, 1997). Although much of the original extent of coastal and freshwater wetlands in Georgia have been lost or altered by natural and human activities, Georgia still retains the highest percentage of pre-colonial wetland acreage of all the southeastern states. Prior to the mid-1990's, the decline of freshwater marshes along the coast was mainly caused by draining them for silviculture operations.

Georgia's 1998-1999 305(b) Water Quality Assessment Report did not identify the drainage and filling of wetlands as the source of impairment to any waters in the state.

When hydrologic changes or pollutants exceed the natural assimilative capacity of wetlands and riparian areas, the systems become stressed and may be degraded or destroyed to the point that the wetlands and riparian areas themselves become sources of nonpoint pollution in coastal waters. A degraded wetland has less ability to remove pollutants and can deliver increased amounts of sediment, nutrients, and other pollutants to the adjoining waterbody.

Management measures for wetlands, riparian areas, and vegetated treatment systems address multiple categories of nonpoint source pollution that affect coastal waters, including the five specific categories of sources previously addressed in this chapter. These measures promote the protection and restoration of wetlands and riparian areas and the use of vegetated treatment systems as means to control the nonpoint pollution emanating from such sources. Management measures are provided for three categories:

- o Protection of wetlands and riparian areas
- o Restoration of wetlands and riparian areas
- o Promoting the use of vegetated treatment systems, such as constructed wetlands and vegetated filter strips

The Environmental Consequences section of the PEIS contains a discussion of the functions and importance of wetlands, riparian areas, vegetated buffers, and vegetated treatment systems.

The intent of the management measures for wetlands, riparian areas and vegetated treatment systems is to ensure that the nonpoint benefits of protecting and restoring wetlands and riparian areas, and of constructing vegetated treatment systems, will be considered in all coastal watershed water pollution control activities. The implementation of management measures will protect and restore the full range of functions for wetlands and riparian areas serving a nonpoint source abatement function and ensure that they do not become a significant nonpoint source due to degradation.

The environmental benefits that result from the implementation of management measures for wetlands, riparian areas, and vegetated treatment systems using the existing programs and authorities discussed below will be enhanced by the requirement that all counties with wetlands must address wetland protection in their master plans and the requirement that all local governments must identify qualifying rivers and develop river corridor protection plans.

Management Measures for Wetlands, Riparian Areas and Vegetated Treatment Systems

These management measures are discussed together because the State intends to implement them using the following programs and authorities:

- Georgia code section 12-2-8 charges the Georgia Department of Natural Resources to develop minimum standards and procedures for the protection of river corridors, wetlands, public water supply watersheds, groundwater protection, and mountains (OCGA 12-2-8, section (b)). These minimum standards would be incorporated into the Comprehensive land use plans developed and implemented by local governments under The Comprehensive Georgia Planning Act of 1989 (OCGA 50-8-1).
- The Criteria for River Corridor Protection (Rules for Environmental Planning Criteria, 391-3-16-.04) requires that local governments identify qualifying rivers within their jurisdiction and develop river corridor protection plans, which would consist of the establishment of riparian buffers along any qualifying river within the local government's jurisdiction, that is, one whose average annual flow is at least 400 cubic feet per second.
- The Department of Community Affairs (DCA) requires all counties with wetlands to address wetland protection in their master plans. The DCA provides a model wetland protection ordinance whose adoption by local governments is not required. However, any county that does not address wetland protection in its regional plan will lose its qualified local government status, making it ineligible for certain types of infrastructure funding.
- The Coastal Marshlands Protection Act is proposed as the enforceable policy and mechanism.

1. *Management Measure for Protection of Wetlands and Riparian Areas*

This management measure is intended to be applied to protect wetlands and riparian areas from adverse nonpoint source pollution impacts. The purpose is to protect the existing water quality improvement functions of wetlands and riparian areas as a component of nonpoint source programs. The overall approach is to establish a set of practices that maintains functions of wetlands and riparian areas and prevents adverse impacts to areas serving a nonpoint source pollution abatement function. These pollution abatement functions are most effective as parts of an integrated land management system that combines nutrient, sediment, and soil erosion control.

2. *Management Measure for Restoration of Wetlands and Riparian Areas*

This management measure is intended to be applied to restore the full range of wetlands and riparian functions in areas where the systems have been degraded and destroyed and where they can serve a significant nonpoint source abatement function. This management measure should be used in conjunction with other measures addressing the adjacent land and water use activities in order to protect coastal water quality.

3. *Management Measure for Vegetated Treatment Systems*

This management measure is intended to be applied in cases where engineered systems of wetlands or vegetated treatment systems can treat nonpoint source pollution. Constructed wetlands and vegetated filter strips can serve a significant nonpoint source pollution abatement function. Vegetated filter strips can improve water quality by removing nutrients, sediment, suspended solids, and pesticides. Constructed wetlands can provide limited ecological benefits in addition to their nonpoint source control functions.

ENVIRONMENTAL CONSEQUENCES

4.A MANAGEMENT MEASURES IMPLEMENTATION, continued

2. SOCIOECONOMIC IMPACTS

a. Section 4.A.2 of the PEIS provides a summary of the economic implications of the management measures guidance as described in the Regulatory Impact Analysis prepared by EPA (USEPA, 1992c). The section also summarizes the economic achievability analyses performed for all nonpoint source categories (USEPA, 1992b; Ogg, 1992; DPRA, 1992; Research Triangle Institute, 1992, 1992a, 1992b, 1992c). These analyses provided a relative sense of the economic impacts of the management measures on affected households, municipalities, and commercial enterprises. EPA determined from these studies that all the management measures specified in its guidance document are economically achievable.

In developing the (g) guidance document, EPA adopted a flexible approach that emphasized broad principles or standards for nonpoint source pollution control that can be applied nationally. This allows states to develop more specific programs that reflect the most cost-effective approaches in response to local conditions.

While the implementation of management measures will entail some economic costs to Georgia, the flexibility embodied in the (g) guidance and in the NOAA/EPA Program Development and Approval Guidance will help to reduce the economic impacts associated with implementing the coastal nonpoint program. For example, Georgia will have until the year 2004 to fully implement the (g) management measures and until 2016 to fully implement its coastal nonpoint program, including additional management measures where necessary. This ability to phase in program implementation over several years allows economic impacts to be absorbed over a longer time period. Another aspect of the flexibility in the program is that states may also exclude categories, subcategories, or individual nonpoint sources where the sources do not exist or are not anticipated to exist, or do not present a threat to coastal waters. This allows states to adopt their programs to local conditions thus implementing their programs in a more cost effective manner.

States may also adopt voluntary, education, and market-based incentive systems in addition to regulatory programs as a means of management measure implementation. Georgia has existing programs that implement the urban pollution prevention management measure through prevention and education programs. For example, the Georgia Cooperative Extension Service has programs, demonstrations, and outreach activities related to the implementation of best management practices for lawns and gardens.

b. The implementation of management measures will also produce positive socioeconomic benefits for Georgia. For example, since many of Georgia's coastal water quality problems are linked to urban sources of pollutants, the urban management measures will help to reduce urban nonpoint sources such as sediment from construction sites, stormwater runoff from highways and developed areas, and leachate from septic systems. In addition, because of the large number of recreational boaters and marinas in Georgia, nonpoint pollution from marinas can be expected to adversely affect coastal resources in certain areas. Management measures that result in improved marina siting and design along with the implementation of best management practices for marina operation and maintenance can reduce impacts associated with this nonpoint source. Implementation of management measures will improve water quality, enhance recreational opportunities, increase property values, provide ground water protection, benefit commercial fisheries, and reduce the risk to human health from water contact activities and consumption of shellfish. Improved water quality will increase the aesthetic value of coastal areas and thus benefit tourism.

4.B PROGRAM IMPLEMENTATION

1. ENVIRONMENTAL IMPACTS

Section 6217 requires that state and territory coastal nonpoint programs contain a number of specific components to be used in developing and implementing their programs. These components are:

- o Coordination with Existing State Programs
- o Determination of the 6217 Management area
- o Implementation of Management Measures in Conformity with (g) Guidance

- o Identification and Implementation of Additional Management Measures
- o Technical Assistance
- o Public Participation
- o Administrative Coordination
- o Identification of Enforceable Policies and Mechanisms

The environmental consequences of these components are discussed below.

a. Coordination with Existing State Programs

The statute requires that coastal nonpoint programs be closely coordinated with state and local water quality plans and programs and with state coastal zone management programs. This requirement is necessary to ensure that the new coastal nonpoint program can build upon and be integrated into existing state programs upon approval. States should develop their programs to complement and strengthen existing coastal management and nonpoint source authorities. This should produce a positive environmental consequence by minimizing unnecessary duplication or conflicts at the Federal, state, or local levels. It will also fulfill what the statute and legislative history indicate is the central purpose of section 6217, i.e., to strengthen the links between Federal and state coastal zone management and water quality programs in order to enhance state and local efforts to manage land use activities that degrade coastal waters.

The Georgia Environmental Protection Division (EPD) in the Department of Natural Resources is the lead state agency responsible for developing and implementing the coastal nonpoint program. The EPD will work with the Georgia Departments of Community Affairs, Transportation, and Human Resources and with the Georgia Environmental Protection Division, Forestry Commission, Ports Authority, Historic Preservation Division, Jekyll Island Authority, Office of the Secretary of State, Public Service Commission, the Wildlife Resources Division, and the Parks, Recreation and Historic Sites Division to ensure that the program is coordinated with existing state programs.

The Georgia nonpoint source program developed pursuant to section 319 of the Clean Water Act is administered by the Georgia Department of Natural Resources.

The Georgia coastal zone management program is administered through the Coastal Resources Division (CRD). The CRD administers permitting programs under the Coastal Marshlands Protection Act and Shore Protection Act; issues revocable licenses for use of state-owned water bottoms; monitors coastal water quality; and manages shellfish harvest areas. The CRD also provides technical assistance to local governments to assist in their planning efforts. Memoranda of Agreement between the CRD and other state agencies with regulatory authority in the coastal area help ensure that all agencies are involved in the coastal management program.

b. 6217 Management Area

As directed by section 6217, NOAA, in consultation with EPA, reviewed each state's existing coastal zone boundary established under the CZMA, and made recommendations to the states on the geographic scope of their programs, i.e., the 6217 management area. This boundary recommendation, which was based on coastal watersheds, is a guide for states to use during

program development. States may propose an alternative 6217 management area at the time of program submission. This proposal will then be evaluated by NOAA and EPA as part of the program review and approval process.

This provision has a positive environmental effect because it recognizes that land and water uses both within and outside of the existing coastal zone have the potential to degrade coastal waters. Evaluating coastal watersheds, whether or not those watersheds are completely encompassed within a state's existing coastal zone, ensures that all potential sources of nonpoint pollution that significantly affect coastal waters are included in the coastal nonpoint programs.

Georgia proposed utilizing the existing coastal zone boundary to define the 6217 management area. NOAA and EPA find that Georgia's proposed boundary excludes existing land and water uses that have or reasonably are expected to have a significant impact on coastal waters. NOAA and EPA find that Georgia's proposed boundary excludes nonpoint sources inland of the state's proposed boundary and have not accepted the boundary as proposed by Georgia. Final approval of the 6217 management area boundary is subject to the following condition: Within one year, the Georgia Department of Natural Resources, U.S. Environmental Protection Agency, National Oceanic and Atmospheric Administration and other relevant State, local, and Federal agencies will participate in a cooperative process to determine an appropriate 6217 management area boundary to protect the State's coastal waters from nonpoint source pollution.

c. Implementation of Management Measures in Conformity with (g) Guidance

For program approval, each coastal nonpoint program must provide for the implementation, at a minimum, of management measures in conformity with the guidance published by EPA under section 6217(g). As discussed in section 4.A, this guidance addresses five categories of nonpoint pollution: agricultural runoff, urban runoff, forestry runoff, marinas, and hydromodification. Guidance is also provided for wetlands, riparian areas, and vegetated filter strips. The environmental consequences of implementing each of these management measures is discussed above in section 4.A.1. In order to satisfy statutory requirements, state programs must identify the nonpoint source categories that will be addressed; management measures for those categories; and the process by which the state will ensure the implementation of the management measures. Each coastal nonpoint program must address each of the management measures by either implementing that measure (or an equally effective alternative), or justifying why the management measure is not included in the program.

The requirement that states implement the appropriate measures should have a positive environmental effect because the management measures are designed to reduce pollution from categories and sources of nonpoint pollution that can adversely impact a state's coastal waters. In addition, a state may include management measures for sources not identified in the 6217(g) guidance, if it determines such measures are necessary to protect coastal waters.

Upon fulfillment of the conditions listed in Section 2.B of this environmental assessment, the Georgia program will provide for implementation of management measures for agricultural, urban, forestry, marinas, and hydromodification nonpoint source categories, and for wetlands, riparian areas, and vegetated treatment systems. Georgia requested an exclusion for

the forestry source category but NOAA and EPA do not find that there is sufficient justification for an exclusion.

d. Requirements for Implementation of Additional Management Measures

For program approval, coastal nonpoint programs must provide for the implementation of additional management measures where coastal water quality is impaired or threatened even after the implementation of the management measures specified in the (g) guidance. These additional management measures are to be applied both to existing land and water uses that are found to cause or contribute to water quality impairment and to new or substantially expanding land uses within critical coastal areas adjacent to impaired or threatened coastal waters.

This requirement should have a beneficial environmental effect because it will provide a second tier of protection where necessary to attain and maintain water quality standards and protect critical areas against future pollution problems.

Georgia's program provides for the implementation and continuing revision of additional management measures applicable to critical coastal areas and to cases where (g) measures are fully implemented but water quality threats or impairments persist.

e. Technical Assistance

For program approval, coastal nonpoint programs are required to provide for technical and other assistance to local governments and the public for implementing the additional management measures. States are also encouraged to provide assistance to local governments and the public for the implementation of the (g) guidance measures. Assistance may be provided in developing ordinances and regulations, technical guidance, training, financial incentives, or demonstration projects.

This requirement will be environmentally beneficial because the technical assistance will enable the management measures to be better implemented at the regional or local level. The assistance will address local needs with respect to implementation and will provide a better understanding of what the measures are trying to accomplish and how to best accomplish it. EPA has assembled a great deal of technical information during the development of its guidance document. This information will be available to the states in a variety of formats, including bibliographies and summaries, and by electronic bulletin boards.

Georgia has a number technical assistance programs available to the public through local governments, nonprofit organizations, and state agencies responsible for implementing the States coastal nonpoint pollution control program. The State's submittal provided listings of the key nonpoint source-related technical assistance programs, the targeted user groups, and the agencies responsible for implementation of the program.

f. Public Participation

For program approval, states must provide opportunities for public participation in all aspects of the coastal nonpoint program. Congress intended that the public be involved in the development and implementation of the program, calling not only for public participation, but also for public education.

Involving the public early in the development of the program should help improve

acceptance of the program and promote and maintain the public's long-term commitment to support the goals of section 6217. Specifically providing opportunities for public comment, especially by those regulated or affected by the program, prior to program development and implementation can ensure that the program will be accepted, and therefore more effective in controlling nonpoint pollution. The public education aspect of the requirement will be beneficial by making individuals more aware of the impact of their actions on coastal waters and by generating support for pollution control efforts at the state and local level.

Georgia has a variety of methods and programs to meet the (g) management measures for public education and participation. Georgia has solicited public involvement in the program by recruiting representatives of key agencies and members of industry that govern the NPS land categories to serve on the Nonpoint Source Advisory Committee. Additionally, Georgia has a number of new and ongoing public education programs and events that will serve as forums for the exchange of information about the NPS program. Public education will be coordinated with the University of Georgia Marine Extension Service in Brunswick, the U.S. Fish and Wildlife Service, and the Sapelo Island National Estuarine Research Reserve (NERR). The Sapelo Island NERR has agreed to provide logistical help with many of DNR's outreach activities and to work with the DNR's Coastal Resources Division on collaborative presentations.

g. Administrative Coordination

For program approval, the coastal nonpoint program must include administrative coordination mechanisms. At a minimum, the program must include a list of state, regional and local agencies and the role that they will play in developing and implementing the program.

This requirement will be environmentally beneficial because it will help avoid conflicts and duplication of effort among the agencies involved in the coastal nonpoint program and ensure that the various agencies are fulfilling their responsibilities to implement the program. In recognizing their specific responsibilities, agencies will be able to refine policies and procedures and maximize limited resources to more effectively support the goals of section 6217.

As discussed in section 4.B.1.a above, the primary mechanisms for implementation of the Georgia nonpoint program will be administered through existing state regulatory agencies, with the Environmental Protection Division in the Department of Natural Resources being the lead state agency.

In 1998, Georgia established a Nonpoint Source Advisory Committee consisting of industry and agency representatives from each land use category which serves as the primary forum for coordinating existing NPS programs. Four subcommittees were formed for each land use category and charged with developing a plan of action assessing the effectiveness of program implementation and to develop a five-year plan of action to address shortcomings. In December 2000, the agricultural subcommittee began to document BMP implementation goals and provide records of BMP implementation for each existing pollution control program for the purpose of monitoring effectiveness.

h. Monitoring

For program approval, the coastal nonpoint program must contain a description of any necessary monitoring techniques to accompany the management measures to assess over time the

success of the measures in reducing pollution loads and improving water quality. The EPA (g) guidance provides guidance for measuring changes in pollution loads and in water quality that may result from the implementation of management measures and for ensuring that the measures are implemented, inspected, and maintained properly.

This requirement should have a beneficial environmental effect because water quality monitoring is the most direct and defensible tool available to evaluate water quality and its response to management measures and other factors. By tracking management measures and water quality simultaneously, states will be able to evaluate the performance of the management measures and determine the need for additional management measures to meet water quality objectives.

As discussed in Section 2.B(13) of this EA, the Georgia program submission does not include a monitoring plan. In order to receive final program approval, the State must finalize a plan and include it in its program within one year. Georgia proposes a three-pronged approach: 1) demonstration projects of BMPs; 2) long-term water quality monitoring; 3) a management measure tracking system. Agriculture, forestry, marinas and recreational boating, and wetlands all have in place or are developing monitoring and tracking systems. Hydromodifications are considered such a rare event in the coastal zone that a monitoring system is not believed to be necessary. Additional information must be submitted to substantiate this determination. No information was provided to NOAA and EPA on monitoring system for urban management measures.

i. Enforceable Policies and Mechanisms

For program approval, the coastal nonpoint program must contain enforceable policies and mechanisms to implement the applicable requirements of section 6217, i.e., the (g) measures and additional management measures. The term “enforceable policy” is defined in the CZMA to mean state policies which are legally binding through constitutional provisions, laws, regulations, land use plans, ordinances, or judicial or administrative decisions, by which a state exerts control over private and public land and water uses and natural resources in the coastal zone. Voluntary approaches, including economic incentives, may be used to implement management measures as long as they are backed by enforceable authorities.

This requirement will be environmentally beneficial because states will be able to use a variety of regulatory and/or non-regulatory approaches in order to ensure implementation of the management measures. In addition, the selection and design of enforceable policies can be tailored to specific state or local circumstances. The success of the implementation of the policies can also be enhanced through public education and technical assistance programs.

The Georgia Department of Natural Resources, Coastal Resources Division, is the lead state agency responsible for developing and implementing the coastal nonpoint program. Management measures for agricultural runoff will be implemented through the Georgia Water Quality Control Act, the Soil and Water Conservation Commission, an Agricultural/Irrigation Task Force, and the Georgia Farm Assessment System.

Management measures for urban runoff will be implemented through the Erosion and Sedimentation Act, the Water Quality Control Act, the River Basin Management Planning Act, the Mountain and River Corridor Protection Act, the Source Water Assessment and Protection

Act, the Nonpoint Source Education for Municipal Officials program, the Commercial Pesticide Applicator certification program, the Georgia Department of Human Resources authority to regulate OSDS, and the GDOT Design Guidelines, GDOT Standard Specifications and Special Provisions - Construction of Transportation Systems, and GDOT Construction Guidelines, and the GDOT Work Site Erosion Control Manual.

Management measures for forestry will be implemented through the *Best Management Practices for Forestry* handbook and the Official Code of Georgia which provides for the establishment of a State Board of Registration for Foresters as well as standards of practice for the forest industry.

Management measures for marinas will be implemented through the Coastal Marshlands Protection Act, the Shore Protection Act, the Water Quality Control Act, and the *Best Environmental Practices for Georgia Marinas* guidebook.

Management measures for hydromodifications will be implemented through the Coastal Marshlands Protection Act, the Shore Protection Act, the Georgia Erosion and Sedimentation Act, the Georgia Water Quality Control Act, the Federal Rivers and Harbors Act, the Georgia Stormwater Management Program, the Nationwide 13 permit, and the 401 certification process under the federal Clean Water Act.

Management measures for wetlands, riparian areas, and vegetated treatment systems will be implemented through the Georgia code section 12-2-8 which requires the Department of Natural Resources to develop minimum standards and procedures for the protection of river corridors, wetlands, public water supply watersheds, and groundwater protection; the Comprehensive Georgia Planning Act of 1989, the Criteria for River Corridor Protection, and the Coastal Marshlands Protection Act.

PROGRAM IMPLEMENTATION

2. SOCIOECONOMIC IMPACTS

There should not be any significant socioeconomic impacts associated with the specific components required to be used in developing and implementing the Georgia coastal nonpoint program. However, some localized impacts may result from efforts to protect and restore coastal waters.

The designation of critical coastal areas and the implementation of additional management measures may prohibit development and certain land and water uses in some areas. Georgia has proposed to map threatened or impaired coastal waters and to identify those areas within the 6217 management area in which new or expanding land uses may cause or contribute to the impairment of coastal water quality.

Additional technical assistance may be required by local governments and the public in applying additional management measures. However, because Georgia currently has a number of technical assistance programs, no significant additional socioeconomic impacts should result. These technical assistance programs will be used to assist municipalities and the general public with implementation of the additional management measures.

A positive impact will be attained through Georgia's existing and planned public participation efforts. These efforts give the public the opportunity to participate in the

development of the program and help to improve public acceptance of the program. These efforts should also lead to attitude and behavior changes as people become more aware of the environmentally beneficial goals of the coastal nonpoint program. This will produce an increased public awareness of the potential impacts of their activities on the environment and lead to less pollution and lower socioeconomic costs.

4.C ENVIRONMENTAL / SOCIOECONOMIC IMPACTS OF ALTERNATIVES

a. Approval of Georgia Coastal Nonpoint Program

As discussed in the preceding sections, the approval of the Georgia coastal nonpoint program would have a beneficial effect on the environment because the program would help to control sources of nonpoint pollution and would result in fewer pollutants reaching coastal waters. For example, because urban runoff is a major source of nonpoint pollution in Georgia, the nonpoint program could help to control runoff of pollutants that cause the waters of Penholoway Creek and the Little Satilla River in Wayne County to only partly support designated uses. The program could also control seepage from septic systems that are responsible for the closing of shellfishing waters in Georgia. The coastal nonpoint program would make existing programs more effective by strengthening the links between Federal and Georgia state coastal zone management and water quality programs, thereby improving state and local efforts to manage land use activities that degrade coastal waters and habitats.

The requirement for the program to develop additional management measures, to identify critical coastal areas and coastal waters that are not attaining water quality standards, and to identify the land uses that cause or threaten those coastal waters would have a positive environmental effect by focusing attention on existing or potential problem areas that could degrade coastal waters. Georgia's 305(b) Report, the nonpoint source assessment of surface waters, identifies the state's waterbodies that do not support designated uses. A number of cooperative efforts (e.g., the Suwannee Basin Cooperative Study) are underway to prevent and mitigate nonpoint sources of pollution to these identified areas where nonpoint pollution impacts are known to exist or threaten water quality.

The approval of the Georgia coastal nonpoint program would also have positive socioeconomic benefits. The improvements in coastal water quality that would result from controlling nonpoint source pollution would increase the aesthetic value of coastal areas, and would help ensure that beaches and shellfishing areas remain open, thus benefitting tourism and providing opportunities for boating and swimming and other water-related activities.

b. Conditional Approval of Georgia Coastal Nonpoint Program

The conditional approval of the Georgia coastal nonpoint program will have a beneficial effect on the environment because it will produce the same beneficial results as approval, provided Georgia satisfies the conditions, and will, at least temporarily, avoid the adverse impacts of denying approval. The implementation of portions of a conditionally approved program will begin to fulfill the intent of section 6217 by helping to control sources of nonpoint pollution and

will result in fewer pollutants reaching coastal waters. The same socioeconomic impacts resulting from changes in land and water uses that are associated with approval of the Georgia program should also result from conditional approval.

c. Deny Approval of Georgia Coastal Nonpoint Program

The denial of approval of the Georgia coastal nonpoint program would result in a reliance on existing programs to control nonpoint source pollution. It would result in the loss of a portion of Federal funds awarded under section 306 of the CZMA and section 319 of the CWA. This may produce adverse environmental impacts because it may cause the state not to implement management measures that are meant to control nonpoint pollution.

Nonpoint pollution has caused significant environmental problems in Georgia. Although the majority of rivers, streams, lakes, and estuaries in Georgia fully support designated uses, water quality has continued to deteriorate in many coastal waters. The major cause of impairment on designated uses in rivers and streams is fecal coliform bacteria. Nonpoint pollution from failed septic systems and from urban and agricultural runoff has caused closure of shellfishing areas in St. Catherine's/Sapelo Sounds and in St. Andrew/St. Simons Sounds.

The denial of approval might also have an adverse economic impact because the continued degradation of water quality will affect the recreational and commercial uses and users of coastal waters. Denying approval might also cause the state not to implement a second tier of pollution control provided by additional management measures that are meant to restore degraded coastal waters and protect critical coastal areas against future pollution.

4.D UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

The conditional approval of the Georgia coastal nonpoint pollution control program and the implementation of management measures should not produce any unavoidable adverse environmental impacts. The Georgia coastal nonpoint program is intended to protect the environment by controlling nonpoint pollution and protecting and restoring coastal waters. There may be some changes in the patterns of land and water uses in order to avoid activities that degrade coastal waters and habitats. These changes in activities, such as directing development away from critical coastal areas, should not result in any unavoidable adverse environmental impacts. In addition, section 6217(g) requires a description of any necessary monitoring techniques to accompany the management measures to assess over time the success of the measures in reducing pollution loads and improving water quality. The Georgia program addresses the required monitoring program in Volume I, chapter XI of its program submission.

4.E RELATIONSHIP BETWEEN SHORT-TERM USES OF ENVIRONMENT AND MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

The overall purpose of section 6217 and the Georgia coastal nonpoint pollution control program is to protect and restore coastal waters and thus to enhance the long-term productivity of all coastal resources. The NOAA/EPA review of the Georgia program and preparation of this environmental assessment have not indicated that the Georgia program includes any short-term

uses of the environment that may reduce long-term productivity. Some short-term uses of the environment may have to be modified in response to implementation of management measures. This may result in short-term costs to the users, but will result in long-term benefits to the environment through cleaner coastal waters, protected resources, and increased productivity.

4.F IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NOAA does not anticipate any irreversible or irretrievable commitment of resources as a result of the conditional approval of the Georgia coastal nonpoint program. However, the section 6217 requirements for states and territories to establish a 6217 management area, to implement management measures in this area, and to identify and map critical coastal areas that need additional measures to protect them against present and future nonpoint pollution problems, may have the effect of reallocating resources for an indefinite period of time. The identification of critical areas may also have the effect of restricting development or other activities in the critical areas and concentrating these activities in other locations. Although development activity results in the affected site being committed to the new use for an indefinite period of time, and can practically be considered an irretrievable commitment of resources, the amount of resources is expected to be minimal. Also, although critical areas may need special controls such as setbacks and low density zoning to protect coastal waters, these designations may change in the future.

5. LIST OF PREPARERS

Joseph P. Flanagan - Environmental Protection Specialist, Coastal Programs Division in the Office of Ocean and Coastal Resource Management, had lead responsibility for the preparation of the Georgia environmental assessment. He has been involved in the preparation of environmental impact statements and assessments since 1980 in NOAA's coastal nonpoint pollution control, ocean minerals, and ocean thermal energy conversion programs. He has a B.S. in Geology/Chemistry from the University of Miami and an M.S. in Environmental Systems Management from The American University.

6. LIST OF AGENCIES AND PERSONS CONSULTED

The following Federal and Georgia agencies were consulted during the preparation of the environmental assessment and during the review of the Georgia coastal nonpoint program. These agencies also received a copy of the environmental assessment.

Federal Agencies

Environmental Protection Agency
Office of Wetlands, Oceans and Watersheds
Office of Ecosystem Protection
Region 4 - Nonpoint Source Coordinator
Department of Commerce
National Marine Fisheries Service
Department of the Interior
U.S. Fish and Wildlife Service

Georgia Agencies

Department of Natural Resources
Department of Community Affairs
Department of Transportation
Department of Human Resources
Forestry Commission
Ports Authority
Historic Preservation Division
Jekyll Island Authority
Office of the Secretary of State
Public Service Commission
Wildlife Resources Division
Parks, Recreation and Historic Sites Division
Forestry Commission
Coastal Georgia Regional Development Center

7. FINDING OF NO SIGNIFICANT ENVIRONMENTAL IMPACT

Having reviewed the environmental assessment and the available information relating to the proposed action, I have determined that there will be no significant environmental impacts resulting from the action different from those analyzed in the Programmatic Environmental Impact Statement prepared for the 6217 program. Preparation of an environmental impact statement on the action is not required by Section 102 (2) (c) of the National Environmental Policy Act or its implementing regulations.

Acting Assistant Administrator for Ocean Services
and Coastal Zone Management, NOAA

Date

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APPENDIX A. MANAGEMENT MEASURES FOR SOURCES OF NONPOINT POLLUTION IN COASTAL WATERS

1. Management Measures for Agricultural Sources

1. Erosion and Sediment Control Management Measure

Apply the erosion component of a Conservation Management System (CMS) as defined in the Field Office Technical Guide of the U.S. Department of Agriculture Natural Resources Conservation Service to minimize the delivery of sediment from agricultural lands to surface waters, or

Design and install a combination of management and physical practices to settle the settleable solids and associated pollutants in runoff delivery from the contributing area for storms of up to and including a 10-year, 24-hour frequency.

2a. Management Measure for Facility Wastewater and Runoff from Confined Animal Facility Management (Large Units).

Limit the discharge from the confined animal facility to surface waters by:

(1) Storing both the facility wastewater and the runoff from confined animal facilities that is caused by storms up to and including a 25-year, 24-hour frequency storm.

Storage structures should:

(a) Have an earthen lining or plastic membrane lining, or

(b) Be constructed with concrete, or

(c) Be a storage tank; and

(2) Managing stored runoff and accumulated solids from the facility through an appropriate waste utilization system.

This management measure is intended to be applied to all new facilities regardless of size and to all new or existing confined animal facilities that contain the following number of head or more:

	<u>Head</u>	<u>Animal Units</u>
Beef Feedlots	300	300
Stables (horses)	200	400
Dairies	70	98
Layers	15,000	150 ¹
		495 ²
Broilers	15,000	150 ¹
		495 ²
Turkeys	13,750	2,475
Swine	200	80

This measure does not apply to those facilities that are defined as concentrated animal feeding operations by Federal regulation 40 CFR 122 and are required to obtain NPDES discharge permits. This regulation allows the Director of a NPDES discharge program to designate any animal feeding operation as a concentrated animal feeding operation (thus subjecting the operation to NPDES program requirements) upon determining that it is a significant contributor of pollution. If an NPDES permit is issued, the terms of the permit apply and this management measure is not required.

A confined animal facility is a lot or facility (other than an aquatic animal production

facility) where the following conditions are met:

- Animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and
- Crops, vegetation forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.

2b. Management Measure for Facility Wastewater and Runoff from Confined Animal Facility Management (Small Units)

Design and implement systems that collect solids, reduce contaminant concentrations, and reduce runoff to minimize the discharge of contaminants in both facility wastewater and in runoff that is caused by storms up to and including a 25-year, 24-hour frequency storm. Implement these systems to substantially reduce significant increases in pollutant loadings to ground water. Manage stored runoff and accumulated solids from the facility through an appropriate waste utilization system.

This management measure is intended to be applied to all existing confined animal facilities that contain the following number of head:

	Head	Animal Units
Beef Feedlots	50-299	50-299 1b
Stables (horses)	100-199	200-399
Dairies	20-69	28-97
Layers	5000-14,999	50-149 ³
		165-494 ⁴
Broilers	5,000-14,999	50-149 ³
		165-494 ⁴
Turkeys	5,000-13,749	900-2,474
Swine	100-199	40-79

³ If facility has a liquid manure system, as used in 40 CFR Section 122, App.B.

⁴ If facility has continuous overflow watering, as used in 40 CFR Section 122, App.B.

This measure is subject to the same NPDES designation criteria mentioned for large unit animal facilities. Facilities containing fewer than the number of head listed above are not subject to this management measure. Existing facilities that meet the requirements of management measures for large units are in compliance with the requirements of this measure. Existing and new facilities that already minimize the discharge of contaminants to surface waters, protect against contamination of ground water, and have an appropriate waste utilization system may already meet the requirements of this measure. Such facilities may not need additional controls for the purposes of this measure.

3. Nutrient Management Measure

Develop, implement, and periodically update a nutrient management plan to:

(1) apply nutrients at rates necessary to achieve realistic crop yields, (2) improve the timing of nutrient application, and (3) use agronomic crop production technology to increase nutrient use efficiency. When the source of the nutrients is other than commercial fertilizer, determine the nutrient value and the rate of availability of the nutrients. Determine and credit the nitrogen contribution of any legume crop. Soil and plant tissue testing should be used routinely.

Nutrient management plans contain the following core components:

(1) Farm and field maps showing acreage, crops, soils, and waterbodies.

(2) *Realistic yield expectations for the crop(s) to be grown, based primarily on the producer's actual yield history, State Land Grant University yield expectations for the soil series, or SCS Soils-5 information for the soil series.*

(3) *A summary of the nutrient resources available to the producer, which at a minimum include:*

- *Soil test results for pH, phosphorus, nitrogen, and potassium;*
- *Nutrient analysis of manure, sludge, mortality compost or effluent;*
- *Nitrogen contributions to the soil from legumes grown in the rotation;*
- *Other significant nutrient sources (e.g., irrigation water).*

(4) *An evaluation of field limitations based on environmental hazards or concerns, such as,*

- *Sinkholes, shallow soils over fractured bedrock, and soils with high leaching potential,*
- *Lands near surface water,*
- *Highly erodible soils, and,*
- *Shallow aquifers.*

(5) *Use of the limiting nutrient concept to establish the mix of nutrient sources and requirements for the crop based on a realistic yield expectation.*

(6) *Identification of timing and application methods for nutrients to: provide nutrients at rates necessary to achieve realistic crop yields; reduce losses to the environment; and avoid applications as much as possible to frozen soil and during periods of leaching and runoff.*

(7) *Provisions for the proper calibration and operation of nutrient application equipment.*

4. Pesticide Management Measure

To reduce contamination of surface water and ground water from pesticides:

- (1) *Evaluate the pest problems, previous pest control measures, and cropping history;*
- (2) *Evaluate the soil and physical characteristics of the site including mixing, loading, and storage areas for potential leaching or runoff of pesticides. If leaching or runoff is found to occur, steps should be taken to prevent further contamination;*
- (3) *Use integrated pest management (IPM) strategies that:*
 - (a) *Apply pesticides only when an economic benefit to the producer will be achieved (i.e., applications based on economic thresholds); and*
 - (b) *Apply pesticides efficiently and at times when runoff are unlikely;*
- (4) *When pesticide applications are necessary and a choice of registered materials exists, consider the persistence, toxicity, runoff potential, and leaching potential of products in making a selection;*
- (5) *Periodically calibrate pesticide spray equipment; and*
- (6) *Use anti-backflow devices on hoses used for filling tank mixtures.*

5. Grazing Management Measure

Protect range, pasture and other grazing lands:

- (1) *By implementing one or more of the following to protect sensitive areas (such as streambanks, wetlands, estuaries, ponds, lake shores, and riparian zones):*
 - (a) *Exclude livestock,*
 - (b) *Provide stream crossings or hardened watering access for drinking,*
 - (c) *Provide alternative drinking water locations,*
 - (d) *Locate salt and additional shade, if needed, away from sensitive areas, or*
 - (e) *Use improved grazing management (e.g., herding)**to reduce the physical disturbance and reduce direct loading of animal waste*

and sediment caused by livestock; and

(2) By achieving either of the following on all range, pasture, and other grazing lands not addressed under (1):

- (a) Implement the range and pasture components of a Conservation Management System (CMS) as defined in the Field Office Technical Guide of the USDA-SCS by applying the progressive planning approach of the USDA Soil Conservation Service (SCS) to reduce erosion, or*
- (b) Maintain range, pasture, and other grazing lands in accordance with activity plans established by either the Bureau of Land Management of the U.S. Department of the Interior or the Forest Service of the USDA.*

6. Irrigation Water Management

To reduce nonpoint source pollution of surface waters caused by irrigation:

- (1) Operate the irrigation system so that the timing and amount of irrigation water applied match crop water needs. This will require, as a minimum: (a) the accurate measurement of soil-water depletion volume and the volume of irrigation water applied, and (b) uniform application of water.*
- (2) When chemigation is used, include backflow preventers for wells, minimize the harmful amounts of chemigated waters that discharge from the edge of the field, and control deep percolation. In cases where chemigation is performed with furrow irrigation systems, a tailwater management system may be needed.*

The following limitations and special considerations apply:

- (1) In some locations, irrigation return flows are subject to other water rights or are required to maintain stream flow. In these special cases, on-site reuse could be precluded and would not be considered part of the management measure for such locations.*
- (2) By increasing the water use efficiency, the discharge volume from the system will usually be reduced. While the total pollutant load may be reduced somewhat, there is the potential for an increase in the concentration of pollutants in the discharge. In these special cases, where living resources or human health may be adversely affected and where other management measures (nutrients and pesticides) do not reduce concentrations in the discharge, increasing water use efficiency would not be considered part of the management measure.*
- (3) In some irrigation districts, the time interval between the order for and the . . . delivery of irrigation water to the farm may limit the irrigator's ability to achieve the maximum on-farm application efficiencies that are otherwise possible.*
- (4) In some locations, leaching is necessary to control salt in the soil profile. Leaching for salt control should be limited to the leaching requirement for the root zone.*
- (5) Where leakage from delivery systems or return flows supports wetlands or wildlife refuges, it may be preferable to modify the system to achieve a high level of efficiency and then divert the "saved water" to the wetland or wildlife refuge. This will improve the quality of water delivered to wetlands or wildlife refuges by preventing the introduction of pollutants from irrigated lands to such diverted water.*
- (6) In some locations, sprinkler irrigation is used for frost or freeze protection, or for crop cooling. In these special cases, applications should be limited to the amount necessary for crop protection, and applied water should remain on-site.*

2. Management Measures for Urban Areas

1. New Development Management Measure

(1) By design or performance:

(a) After construction has been completed and the site is permanently stabilized, reduce the average annual total suspended solid (TSS) loadings by 80 percent. For the purposes of this measure, an 80 percent TSS reduction is to be determined on an average annual basis, or*

(b) Reduce the postdevelopment loadings of TSS so that the average annual TSS loadings are no greater than predevelopment loadings, and

(2) To the extent practicable, maintain postdevelopment peak runoff rate and average volume at levels that are similar to predevelopment levels.

Sound watershed management requires that both structural and nonstructural measures be employed to mitigate the adverse impacts of storm water.

Nonstructural Management Measures 11.B and 11.C can be effectively used in conjunction with Management Measure 11.A to reduce both the short-and long-term costs of meeting the treatment goals of this management measure.

** Based on the average annual TSS loadings from all storms less than or equal to the 2-year/24 hour storm. TSS loadings from storms greater than the 2-year/24 hour storm are not expected to be included in the calculation of the average annual TSS loadings.*

2. Watershed Protection Management Measure

Develop a watershed protection program to:

(1) Avoid conversion, to the extent practicable, of areas that are particularly susceptible to erosion and sediment loss;

(2) Preserve areas that provide important water quality benefits and/or are necessary to maintain riparian and aquatic biota; and

(3) Site development, including roads, highways, and bridges, to protect to the extent practicable the natural integrity of waterbodies and natural drainage systems

3. Site Development Management Measure

Plan, design, and develop sites to:

(1) Protect areas that provide important water quality benefits and/or are particularly susceptible to erosion and sediment loss;

(2) Limit increases of impervious areas, except where necessary;

(3) Limit land disturbance activities such as clearing and grading, and cut and fill to reduce erosion and sediment loss; and

(4) Limit disturbance of natural drainage features and vegetation.

4. Construction Site Erosion and Sediment Control Management Measure

(1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction, and

(2) Prior to land disturbance, prepare and implement an approved erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions.

5. Construction Site Chemical Control Management Measure

- (1) Limit application, generation, and migration of toxic substances;*
- (2) Ensure the proper storage and disposal of toxic materials; and*
- (3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters.*

6. Existing Development Management Measure

Develop and implement watershed management programs to reduce runoff pollutant concentrations and volumes from existing development:

- (1) Identify priority local and/or regional watershed pollutant reduction opportunities, e.g., improvements to existing urban runoff control structures;*
- (2) Contain a schedule for implementing appropriate controls;*
- (3) Limit destruction of natural conveyance systems; and*
- (4) Where appropriate, preserve, enhance, or establish buffers along surface waterbodies and their tributaries.*

7. New Onsite Disposal Systems Management Measures

- (1) Ensure that new Onsite Disposal Systems (OSDS) are located, designed, installed, operated, inspected, and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable reduce the discharge of pollutants into ground waters that are closely hydrologically connected to surface waters. Where necessary to meet these objectives: (a) discourage the installation of garbage disposals to reduce hydraulic and nutrient loadings; and (b) where low-volume plumbing fixtures have not been installed in new developments or redevelopments, reduce total hydraulic loadings to the OSDS by 25 percent. Implement OSDS inspection schedules for preconstruction, construction, and postconstruction.*
- (2) Direct placement of OSDS away from unsuitable areas. Where OSDS placement in unsuitable areas is not practicable, ensure that the OSDS is designed or sited at a density so as not to adversely affect surface waters or ground water that is closely hydrologically connected to surface water. Unsuitable areas include, but are not limited to, areas with poorly or excessively drained soils; areas with shallow water tables or areas with high seasonal water tables; areas overlaying fractured bedrock that drain directly to ground water; areas with floodplains; or areas where nutrient and/or pathogen concentrations in the effluent cannot be sufficiently treated or reduced before the effluent reaches sensitive waterbodies;*
- (3) Establish protective setbacks from surface waters, wetlands, and floodplains for conventional as well as alternative OSDS. The lateral setbacks should be based on soil type, slope, hydrologic factors, and type of OSDS. Where uniform protective setbacks cannot be achieved, site development with OSDS so as not to adversely affect waterbodies and/or contribute to a public health nuisance.*
- (4) Establish protective separation distances between OSDS system components and groundwater which is closely hydrologically connected to surface waters. The separation distances should be based on soil type, distance to ground water, hydrologic factors, and type of OSDS;*
- (5) Where conditions indicate that nitrogen-limited surface waters may be adversely*

affected by excess nitrogen loadings from ground water, require the installation of OSDS that reduce total nitrogen loadings by 50 percent to ground water that is closely hydrologically connected to surface water.

8. Operating Onsite Disposal Systems Management Measure

(1) Establish and implement policies and systems to ensure that existing OSDS are operated and maintained to prevent the discharge of pollutants to the surface of the ground and to the extent practicable reduce the discharge of pollutants into ground waters that are closely hydrologically connected to surface waters. Where necessary to meet these objectives, encourage the reduced use of garbage disposals, encourage the use of low-volume plumbing fixtures, and reduce total phosphorus loadings to the OSDS by 15 percent (if the use of low-level phosphate detergents has not been required or widely adopted by OSDS users). Establish and implement policies that require an OSDS to be repaired, replaced, or modified where the OSDS fails, or threatens or impairs surface waters;

(2) Inspect OSDS at a frequency adequate to ascertain whether OSDS are failing:

(3) Consider replacing or upgrading OSDS to treat influent so that total nitrogen loadings in the effluent are reduced by 50 percent. This provision applies only:
(a) where conditions indicate that nitrogen-limited surface waters may be adversely affected by significant ground water nitrogen loadings from OSDS;
(b) where nitrogen loadings from OSDS are delivered to ground water that is closely hydrologically connected to surface water.

9. Pollution Prevention Management Measure

Implement pollution prevention and education programs to reduce nonpoint source pollutants generated from the following activities, where applicable:

- o The improper storage, use and disposal of household hazardous chemicals, including automobile fluids, pesticides, paints, solvents, etc.,*
- o Lawn and garden activities, including the application and disposal of lawn and garden care products, and the improper disposal of leaves and yard trimmings;*
- o Turf management on golf courses, parks, and recreational areas;*
- o Improper operation and maintenance of onsite disposal systems;*
- o Discharge of pollutants into storm drains including floatables, waste oil, and litter;*
- o Commercial activities including parking lots, gas stations, and other entities not under NPDES purview; and*
- o Improper disposal of pet excrement.*

10. Management Measure for Planning, Siting, and Developing Roads and Highways

Plan, site, and develop roads and highways to:

- (1) Protect areas that provide important water quality benefits or are particularly susceptible to erosion or sediment loss; and*
- (2) Limit land disturbance such as clearing and grading and cut and fill to reduce erosion and sediment loss; and*
- (3) Limit disturbance of natural drainage features and vegetation.*

11. Management Measure for Bridges

Site, design, and maintain bridge structures so that sensitive and valuable aquatic

ecosystems and areas providing important water quality benefits are protected from adverse effects.

12. Management Measure for Construction Projects

(1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction and;

(2) Prior to land disturbance, prepare and implement an approved erosion control plan or similar administrative document that contains erosion and sediment control provisions.

13. Management Measure for Construction Site Chemical Control

(1) Limit the application, generation, and migration of toxic substances;

(2) Ensure the proper storage and disposal of toxic materials; and

(3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface water.

14. Management Measure for Operation and Maintenance

Incorporate pollution prevention procedures into the operation and maintenance of roads, highways, and bridges to reduce pollutant loadings to surface waters.

15. Management Measure for Road, Highway, and Bridge Runoff Systems

Develop and implement runoff management systems for existing roads, highways, and bridges to reduce runoff pollutant concentrations and volumes entering surface waters.

(1) Identify priority and watershed pollutant reduction opportunities (e.g., improvements to existing urban runoff control structures; and

(2) Establish schedules for implementing appropriate controls.

3. Management Measures for Forestry

1. Preharvest Planning

Perform advance planning for forest harvesting that includes the following elements where appropriate:

(1) Identify the area to be harvested including location of waterbodies and sensitive areas such as wetlands, threatened or endangered aquatic species habitat areas, or high-erosion-hazard areas (landslide-prone areas) within the harvest unit.

(2) Time the activity for the season or moisture conditions when the least impact occurs.

(3) Consider potential water quality impacts and erosion and sedimentation control in the selection of silvicultural and regeneration systems, especially for harvesting and site preparation.

(4) Reduce the risk of occurrence of landslides and severe erosion by identifying high-erosion-hazard areas and avoiding harvesting in such areas to the extent practicable.

(5) Consider additional contributions from harvesting or roads to any known existing water quality impairments or problems in watersheds of concern.

Perform advance planning for forest road systems that includes the following elements where appropriate:

- (1) Locate and design road systems to minimize, to the extent practicable, potential sediment generation and delivery to surface waters. Key components are:*
 - o locate roads, landings, and skid trails to avoid to the extent practicable steep grades and steep hillslope areas, and to decrease the number of stream crossings;*
 - o avoid to the extent practicable locating new roads and landings in Streamside Management Areas (SMAs); and*
 - o determine road usage and select the appropriate road standard.*
- (2) Locate and design temporary and permanent stream crossings to prevent failure and control impacts from the road system. Key components are:*
 - o size and site crossing structures to prevent failure;*
 - o for fish-bearing streams, design crossings to facilitate fish passage.*
- (3) Ensure that the design of road prism and the road surface drainage are appropriate to the terrain and that road surface design is consistent with the road drainage structures.*
- (4) Use suitable materials to surface roads planned for all-weather use to support truck traffic.*
- (5) Design road systems to avoid high erosion or landslide hazard areas. Identify these areas and consult a qualified specialist for design of any roads that must be constructed through these areas.*

Each state should develop a process (or utilize an existing process) that ensures that the management measures in the chapter are implemented. Such a process should include appropriate notification, compliance audits, or other mechanisms for forestry activities with the potential for significant adverse nonpoint effects based on the type and size of operation and the presence of stream crossings or SMAs.

2. Streamside Management Areas (SMAs)

Establish and maintain a streamside management area along surface waters, which is sufficiently wide and which includes a sufficient number of canopy species to buffer against detrimental changes in the temperature regime of the waterbody, to provide bank stability, and to withstand wind damage. Manage the SMA in such a way as to protect against soil disturbance in the SMA and delivery to the stream of sediments and nutrients generated by forestry activities, including harvesting. Manage the SMA canopy species to provide a sustainable source of large woody debris needed for instream channel structure and aquatic species habitat.

3. Road Construction/Reconstruction

- (1) Follow preharvest planning (as described under Management Measure 1) when constructing or reconstructing the roadway.*
- (2) Follow designs planned under Management Measure 1 for road surfacing and shaping.*
- (3) Install road drainage structures according to designs planned under Management Measure 1 and regional storm return period and installation specifications. Match these drainage structures with terrain features and with road surface and prism designs.*
- (4) Guard against the production of sediment when installing stream crossings.*
- (5) Protect surface waters from slash and debris material from roadway clearing.*

(6) Use straw bales, silt fences, mulching, or other favorable practices on disturbed soils on unstable cuts, fills, etc.

(7) Avoid constructing new roads in SMAs to the extent practicable.

4. Road Management

(1) Avoid using roads where possible for timber hauling or heavy traffic during wet or thaw periods on roads not designed and constructed for these conditions.

(2) Evaluate the future need for a road and close roads that will not be needed. Leave closed roads and drainage channels in a stable condition to withstand storms.

(3) Remove drainage crossings and culverts if there is a reasonable risk of plugging or failure from lack of maintenance.

(4) Following completion of harvesting, close and stabilize temporary spur roads and seasonal roads to control and direct water away from the roadway. Remove all temporary stream crossings.

(5) Inspect roads to determine the need for structural maintenance. Conduct maintenance practices, when conditions warrant, including cleaning and replacement of deteriorated structures and erosion controls, grading or seeding of road surfaces, and, in extreme cases, slope stabilization or removal of road fills where necessary to maintain structural integrity.

(6) Conduct maintenance activities, such as dust abatement, so that chemical contaminants or pollutants are not introduced into surface waters to the extent practicable.

(7) Properly maintain permanent stream crossings and associated fills and approaches to reduce the likelihood (a) that stream overflow will divert onto roads, and (b) that fill erosion will occur if the drainage structures become obstructed.

5. Timber Harvesting

The timber harvesting management measure consists of implementing the following:

(1) Timber harvesting operations with skid trails or cable yarding follow layouts determined under Management Measure 1.

(2) Install landing drainage structures to avoid sedimentation to the extent practicable. Disperse landing drainage over sideslopes.

(3) Construct landings away from steep slopes and reduce the likelihood of fill slope failures. Protect landing surfaces used during wet periods. Locate landings outside of SMAs.

(4) Protect stream channels and significant ephemeral drainages from logging debris and slash material.

(5) Use appropriate areas for petroleum storage, draining, dispensing. Establish procedures to contain and treat spills. Recycle or properly dispose of all waste materials.

For cable yarding:

- (1) Limit yarding corridor gouge or soil plowing by properly locating cable yarding landings.*
- (2) Locate corridors for SMAs following Management Measure 2.*

For groundskidding:

- (1) Within SMAs, operate groundskidding equipment only at stream crossings to the extent practicable. In SMAs, fell and endline trees to avoid sedimentation.*
- (2) Use improved stream crossings for skid trails which cross flowing drainages. Construct skid trails to disperse runoff and with adequate drainage structures.*
- (3) On steep slopes, use cable systems rather than groundskidding where groundskidding may cause excessive sedimentation.*

6. Site Preparation and Forest Regeneration

Confine on-site potential NPS pollution and erosion resulting from site preparation and the regeneration of forest stands. The components of the management measure for site preparation and regeneration are:

- (1) Select a method of site preparation and regeneration suitable for the site conditions.*
- (2) Conduct mechanical tree planting and ground-disturbing site preparation activities on the contour of sloping terrain.*
- (3) Do not conduct mechanical site preparation and mechanical tree planting in streamside management areas.*
- (4) Protect surface waters from logging debris and slash material.*
- (5) Suspend operations during wet periods if equipment used begins to cause excessive soil disturbance that will increase erosion.*
- (6) Locate windrows at a safe distance from drainages and SMAs to control movement of the material during high runoff conditions.*
- (7) Conduct bedding operations in high-water-table areas during dry periods of the year. Conduct bedding in sloping areas on the contour.*
- (8) Protect small ephemeral drainages when conducting mechanical tree planting.*

7. Fire Management

Prescribe fire for site preparation and control or suppress wildfire in a manner which reduces potential nonpoint source pollution of surface waters:

- (1) Intense prescribed fire should not cause excessive sedimentation due to the combined effect of removal of canopy species and the loss of soil-binding ability of subcanopy and herbaceous vegetation roots, especially in SMAs, in streamside vegetation for small ephemeral drainages, or on very steep slopes.*
- (2) Prescriptions for prescribed fire should protect against excessive erosion or sedimentation to the extent practicable.*
- (3) All bladed firelines, for prescribed fire and wildfire, should be plowed on contour*

or stabilized with water bars and/or other appropriate techniques if needed to control excessive sedimentation or erosion of the fireline.

(4) Wildfire suppression and rehabilitation should consider possible NPS pollution of watercourses, while recognizing the safety and operational priorities of fighting wildfires.

8. Revegetation of Disturbed Areas

Reduce erosion and sedimentation by rapid vegetation of areas disturbed by harvesting operations or road construction:

(1) Revegetate disturbed areas (using seeding or planting) promptly after completion of the earth-disturbing activity. Local growing conditions will dictate the timing for establishment of vegetative cover.

(2) Use mixes of species and treatments developed and tailored for successful vegetation establishment for the region or area.

(3) Concentrate revegetation efforts initially on priority areas such as disturbed areas in SMAs or the steepest areas of disturbance near drainages.

9. Forest Chemical Management

Use chemicals when necessary for forest management in accordance with the following to reduce nonpoint source pollution impacts due to the movement of forest chemicals off-site during and after application:

(1) Conduct applications by skilled and, where required, licensed applicators according to the registered use, with special consideration given to impacts to nearby surface waters.

(2) Carefully prescribe the type and amount of pesticides appropriate for the insect, fungus, or herbaceous species.

(3) Prior to applications of pesticides and fertilizers, inspect the mixing and loading process and the calibration of equipment, and identify the appropriate weather conditions, the spray area, and buffer areas for surface waters.

(4) Establish and identify buffer areas for surface waters. (This is especially important for aerial applications.)

(5) Immediately report accidental spills of pesticides or fertilizers into surface waters to the appropriate State agency. Develop an effective spill contingency plan to contain spills.

10. Wetlands Forest

Plan, operate, and manage normal, ongoing forestry activities (including harvesting, road design and construction, site preparation and regeneration, and chemical management) to adequately protect the aquatic functions of forested wetlands.

4. Management Measures for Marinas and Recreational Boating

Siting and Design

1. Marina Flushing Management Measure

Site and design marinas such that tides and/or currents will aid in flushing of the site or renew its water regularly.

2. Water Quality Assessment Management Measure

Assess water quality as part of marina siting and design.

3. Habitat Assessment Management Measure

Site and design marinas to protect against adverse effects on shellfish resources, wetlands, submerged aquatic vegetation, or other important riparian and aquatic habitat areas as designated by local, State, or Federal governments.

4. Shoreline Stabilization Management Measure

Where shoreline erosion is a nonpoint source pollution problem, shorelines should be stabilized. Vegetated methods are strongly preferred unless structural methods are more cost effective, considering the severity of wave and wind erosion, offshore bathymetry, and the potential adverse impact on other shorelines and offshore areas

5. Storm Water Runoff Management Measure

Implement effective runoff control strategies which include the use of pollution prevention activities and the proper design of hull maintenance areas. Reduce the average annual loadings of total suspended solids (TSS) in runoff from hull maintenance areas by 80 percent. For the purposes of this measure, an 80 percent reduction of TSS is to be determined on an average annual basis.

6. Fueling Station Design Management Measure

Design fueling stations to allow for ease in cleanup of spills.

7. Sewage Facility Management Measure

Install pumpout, dump station, and restroom facilities where needed at new and expanding marinas to reduce the release of sewage to surface waters. Design these facilities to allow ease of access and post signage to promote use by the boating public.

Operation and Maintenance

1. Solid Waste Management Measure

Properly dispose of solid wastes produced by the operation, cleaning, maintenance, and repair of boats to limit entry of solid wastes to surface waters.

2. Fish Waste Management Measure

Promote sound fish waste management through a combination of fish-cleaning restrictions, public education, and proper disposal of fish waste.

3. Liquid Material Management Measure

Provide and maintain appropriate storage, transfer, containment, and disposal facilities for liquid material, such as oil, harmful solvents, antifreeze, and paints, and

encourage recycling of these materials.

4. Petroleum Control Management Measure

Reduce the amount of fuel and oil from boat bilges and fuel tank air vents entering marina and surface waters.

5. Boat Cleaning Management Measure

For boats that are in the water, perform cleaning operations to minimize, to the extent practicable, the release to surface waters of (a) harmful cleaners and solvents and (b) paint from in-water hull cleaning.

6. Public Education Management Measure

Public education/outreach/training programs should be instituted for boaters, as well as marina owners and operators, to prevent improper disposal of polluting material.

7. Maintenance of Sewage Facilities Management Measure

Ensure that sewage pumpout facilities are maintained in operational condition and encourage their use.

8. Boat Operation Management Measure (applies to boating only)

Restrict boating activities where necessary to decrease turbidity and physical destruction of shallow-water habitat.

5. Management Measures for Hydromodification

Channelization and Channel Modification

1. Management Measure for Physical and Chemical Characteristics of Surface Waters

(1) Evaluate the potential effects of proposed channelization and channel modification on the physical and chemical characteristics of surface waters in coastal areas;

(2) Plan and design channelization and channel modification to reduce undesirable impacts; and

(3) Develop an operation and maintenance program for existing modified channels that includes identification and implementation of opportunities to improve physical and chemical characteristics of surface waters in those channels.

2. Instream and Riparian Habitat Restoration Management Measure

(1) Evaluate the potential effects of proposed channelization and channel modification on instream and riparian habitat in coastal areas;

(2) Plan and design channelization and channel modification to reduce undesirable impacts; and

(3) Develop an operation and maintenance program with specific timetables for existing modified channels that includes identification of opportunities to restore instream and riparian habitat in those channels.

Dams

1. Management Measure for Erosion and Sediment Control

(1) Reduce erosion and, to the extent practicable, retain sediment onsite during and after construction, and

(2) Prior to land disturbance, prepare and implement an approved erosion and sediment control plan or similar administrative document that contains erosion and sediment control provisions.

2. Management Measure for Chemical and Pollutant Control

(1) Limit application, generation, and migration of toxic substances;

(2) Ensure the proper storage and disposal of toxic materials; and,

(3) Apply nutrients at rates necessary to establish and maintain vegetation without causing significant nutrient runoff to surface waters.

3. Management Measure for Protection of Surface Water Quality and Instream and Riparian Habitat

Develop and implement a program to manage the operation of dams in coastal areas that includes an assessment of:

(1) Surface water quality and instream and riparian habitat and potential for improvement and

(2) Significant nonpoint source pollution problems that result from excessive surface water withdrawals.

Streambank and Shoreline Erosion

1. Management Measure for Eroding Streambanks and Shorelines

(1) Where streambank or shoreline erosion is a nonpoint source pollution problem, streambanks and shorelines should be stabilized. Vegetative methods are strongly preferred unless structural methods are more cost-effective, considering the severity of wave and wind erosion, offshore bathymetry, and the potential adverse impact on other streambanks, shorelines, and offshore areas.

(2) Protect streambank and shoreline features with the potential to reduce NPS pollution.

(3) Protect streambanks and shorelines from erosion due to uses of either the shorelands or adjacent surface waters.

6. Management Measures for Wetlands, Riparian Areas and Vegetated Treatment Systems

1. Management Measure for Protection of Wetlands and Riparian Areas

Protect from adverse effects wetlands and riparian areas that are serving a

significant NPS abatement function and maintain this function while protecting the other existing functions of these wetlands and riparian areas as measured by characteristics such as vegetative composition and cover, hydrology of surface water and ground water, geochemistry of the substrate, and species composition.

2. Management Measure for Restoration of Wetland and Riparian Areas

Promote the restoration of the preexisting functions in damaged and destroyed wetlands and riparian systems in areas where the systems will serve a significant NPS pollution abatement function.

3. Management Measure for Vegetated Treatment Systems

Promote the use of engineered vegetated treatment systems such as constructed wetlands or vegetated filter strips where these systems will serve a significant NPS pollution abatement function.

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